Wildlife Resources, Habitats and Ecosystems for Visitors' Experiential Learning: Educative Wildlife Tourism in the Australian Context

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Tilden's fundamental thesis:
"**Through interpretation, understanding; through understanding, appreciation; through appreciation, protection**."
National Park Service,
U.S. Department of the Interior
Administrative Manual (1953, p. 38)

Abstract

The aim of this chapter on Australian wildlife and tourism is manifold. It discusses the major existing elements necessary for consolidating an educative wildlife tourism within an experiential learning perspective for the visitors by considering some aspects of Kolb's theory. The chapter is concerned with ecological and biological resources, and related phenomena, that are relevant for a meaningful environmental interpretation and education; one of the foundations for an educative tourism together with conservation. The chapter begins by presenting the current protected areas in Australia and their relevance as natural settings and habitats for wild animals and tourism. The discussion continues by critically appraising the role of rangers in managing protected areas, natural resources and visitors. The role of rangers and guides in Parks is fundamental for enhancing visitors' experiences and understanding of natural and cultural settings, landscapes, wildlife, and ecosystems. Rangers also play an important role in promoting visitor education as a way of mitigating possible negative impacts in sensitive natural areas. Yet, the chapter outlines the most popular wild animals by providing a comprehensive description of koalas, kangaroos and Tasmanian devils. The biofacts, physical characteristics, behaviour and pertinent ecological aspects are presented to demonstrate how rich and important wildlife is for tourism, especially for an educative learning tourism that can contribute to connect humans to nature in many ways. The chapter was written based on the outcomes of post-doctoral research qualitatively oriented, based on the pertinent literature, active and observant participation, and on the analysis of websites and documents. Considering a relative paucity of publication on educative wildlife tourism, the chapter seeks to fill some gaps in the literature and to advance the debates on the importance of conservation and protection of wildlife resources within an environmental science perspective.

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8.1 Introduction

About 1800 years ago, Ptolemy, an ancient Greek geographer, included Australia on one of the earliest maps of the world. It was named *Terra Australis Incognita*, an island continent, which means "unknown southern land", the smallest of the seven continents, but the only one to hold just one country…"Australia's geography and wildlife are unlike anywhere else in the world…[throughout its eight ecoregions], animals such as kangaroos, koalas, kookaburras…[and platypuses]" (Banting 2003, p. 4). Australian unique wildlife and varied landscapes are both of great appeal for tourism, and they demand conservation and protection. With a rich biodiversity, Australia becomes an ideal place for outdoor environmental learning experiences for both domestic and foreign visitors. In her handbook on wildlife tourism, Ronda Green mentions why Australia has been so different compared to the rest of the world with regards to its ecosystems and, especially to its wildlife resources,

> Australia was once part of the great southern super-continent called Gondwana […] Australia left Gondwana before any hoofed animals, cats, bears, monkeys, rodents or other placental mammals reached it, but it did have monotremes (egg-laying mammals) and marsupials. As it drifted northwards [it became] isolated from other continents for many millions of years…and developed many unique species, even whole families – koalas, numbats, lyrebirds and many many more. Much more recently (about 3,000 years ago) humans introduced dogs (dingo), and may have introduced a few other species (e.g. bladey grass, bracken) that are widespread in southeast Asia and have been in Australia a long time […] white explorers and settlers have introduced a great variety of animals and plants that have gone wild – rabbits, buffaloes, foxes, blackberries, lantana… the list is very extensive (Green 2014, pp. 31–32).

This brief, but extraordinary citation, reveals how especial is wildlife for tourism and people in Australia. It is advocated in this chapter that the ecological and biological resources and related phenomena are critical for a meaningful environmental interpretation and education; one of the foundations for an educative tourism in line with conservationist management, practices and attitudes in benefit of the natural world and humankind. Protected areas in Australia, the role of rangers and guides, wildlife resources, experiential learning, environmental interpretation and education, and facts and biographic distribution of kangaroos, wallabies, platypuses, dingos, wombats, flying foxes, cassowaries, greater bilby, echidnas, koalas, crocodiles, and Tasmanian devils are part of the discussion in the chapter. A great collection of figures with pictures and diagrams, and tables, helps to illustrate the content. Biofacts, physical characteristics, wild animal behaviour and pertinent ecological aspects are thoroughly presented. What is necessary for developing a meaningful educative wildlife tourism through experiential learning? This is the leading question to be answered.

8.2 Australian Protected Areas, Conservation and Visitors: Natural Settings for Environmental Interpretation and Education

Australia has over 9000 protected areas which cover roughly 95 million hectares, which makes it one of the nations with the greatest proportions of protected areas in terms of land-mass in the world (TTF 2013, p. 5). National Park is one of the categories as a protected area. The notions and definitions of a park vary institutionally and geographically, and the term eludes various approaches regarding its many possible uses in different regions and countries; a natural setting that is known as a park in one place may be perceived as a recreational area in another. A historical record shows that a park has been "diverse things as a place to bathe, a hunting preserver, a formal garden…a common space for tethering livestock prior to bartering…in some countries, a place for exercising, walking and nature viewing" (Lankford et al. 2011, p. 4). The term 'national park' is something of a misnomer in Australia, and that most of so-called 'national parks' (of which there are hundreds) are actually state-run.

National Parks usually accommodate an array of outdoor recreation and adventure activities from organised sports, such as mountain-biking, canoeing, rock climbing, abseiling, whitewater rafting to bushwalking, wildlife watching, and nature contemplation (Bell 2005). Often parks are classified based on the types of activities they support and by their use, and a management system can have a holistic approach or a narrow one. Two common categories of recreation areas are activity-oriented structured recreation, with developed structures—thus, more anthropocentric oriented; or resource-oriented non-structured recreation, which gives to this type of park a more biocentric orientation (Frawley 1989; Hu 2002; Lankford et al. 2011; Cocks and Simpson 2015).

In terms of management systems for parks and protected areas, Australia has one of the oldest systems in the world (Frawley 1989; Parkin 2006). The Australian system for park management, for example, is spread at different jurisdictional levels, a matter for Territory, State, and local governments (Baird 1986). Parkin (2006) identified that each "state and territory has its own conservation-focused legislation for the creation and management of protected areas and, or, other natural resource legislation for the protection of flora and fauna" (p. 8). This type of arrangement has led to ten different systems to manage protected areas in Australia

(Worboys et al. 2001). Management can be defined as a set of activities related to decision-making, leadership, planning, and controlling in regard to the various resources of an organisation, such as infrastructural, structural, informational, human and financial resources. The main objective of management is to produce satisfactory managerial and operational outcomes (Davidson et al. 2006).

According to Merriam-Webster Dictionary, management refers to "the act or skill of controlling and making decisions about a business, department, sports team; etc.; the act or process of deciding how to use something". As applied to a park context, management can be understood as any decision-making aiming to promote the effective operationalisation of the Parks, including staff, visitors, finances, conservation, protection, enforcement of law, monitoring, landscapes, water catchment and waterways, and the well-desired protected state of natural areas, that is, decisions over biotic, abiotic elements, and the ecosystems, in the protected areas (Cunningham et al. 2005; Odum 2006). Howard (2013) defines 'managers' as individuals in charge of coordinating efficiently and effectively many resources in their duty areas, for example, the National Parks. The great load of responsibilities in Park management is given to field-related government agencies and departments.

Australian protected area agencies manage a very significant proportion of Australia's natural and cultural assets at local, state, territory, and national level (refer to Table 8.1). In Queensland, protected areas management is under two main Departments: the Department of Natural Resources and Mines; and the Environmental Protection Authority (EPA), which has a specific agency for park management, the Queensland Parks and Wildlife Service (QPWS). In Northern Territory, New South Wales and ACT, parks services have specific policies, plans and manuals which guide them through distinct aspects of natural, cultural, and heritage assets management.

The Australian States do not have a sole integrated park management framework, and "the management of protected areas in Australia involves elements of the multiple use and ecosystem models of land management" (Lawrence 1996). Though this leads to levels of autonomy in terms of management, on the other hand, it may create a more complex park management system with each State ruling and interpreting laws and policies in a distinct and particular view. But, by assessing the main aspects of parks management frameworks it is noted they have several intersections and approaches. Some protected area agencies manage huge territorial land, for example, Parks Victoria is in charge of managing 16% of that State (Stone 2001). Buckley et al. (2003) explain that "each national park under the administration of Parks Australia includes guidelines for asset management in its individual park-management plans" (pp. 56–57).

Australia has 17.88% of its landmass protected in the National Reserve System, NRS, totalling 10,339 units of protected areas over eight states and territories with 137,501,551 ha. The Australian IUCN Reserve Types in the National Reserve System (NRS), there are seven major categories of protected areas: Strict Nature Reserve (IA), Wilderness Area (IB), National Park (II), Natural Monument (III), Habitat/Species Management Area (IV), Protected Landscape/Seascape (V), and Managed Resource Protected Area (VI) (refer to Fig. 8.1). Under the NRS, it was identified 1,086 National Parks covering an area of 38,053,578 ha (Department of Environment, Australia Government). This gives a notion of the terrestrial extension of protected areas in the country not including the marine reserves.

According to the Department of Environment, Australian Government, the vast majority of land belonging to the NRS is open for public access, and visit is controlled by each management plan of the protected area to minimise possible negative impacts and disturbance to sensitive fauna and flora. Restrictions also apply to Indigenous sacred sites in respect to ethnic and cultural issues. Apart from the government protected land, there is private land under the status of protected areas totalling 1,223 units covering 1% of Australia; in general, this type of property belongs to private landholders, community groups, organisations, trustees, and most of them are also open for the public and have a pivotal role in protecting biodiversity in peri-urban or rural areas; they also run volunteer programs, and some properties are equipped and have facilities such as camping sites and walking trails to host independent visitors and tour groups (Department of Environment, Australia Government).

Despite of the existing management plans for running the protected areas, the National Parks Australia Council, NPAC, a non-governmental organisation which represents the views of State and Territory NGOs in the country since its creation in 1975, in a public communication, alerted that the national parks across Australia have faced critical managerial and operational threats such as over-development, including commercial one. In response to these issues, NPAC has promoted awareness campaigns to encourage the various government spheres to implement strategies which can strengthen and reinvigorate the national parks system seeking to guarantee it as a legacy for all Australians and visitors.

In the 1950s and 1960s, the national parks as protected areas with special flora and fauna to be used as recreational resources by the public brought concerns over the adequate level of its use (Manning 2002), and in the beginning of the 1960s the notions of 'carrying capacity' started to pervade debates and the literature. At that time, it became a common sense that natural settings and resources on earth would have their limits for use, making both wilderness management and

Table 8.1 Protected Area Management Agencies in Australia at national, state, territory, local level in the National Reserve System (NRS)

At national level	Commonwealth	• **Environment Australia, including**: – **Parks Australia**: Six Commonwealth National Parks, the Australian National Botanic Gardens, and 58 Commonwealth Marine Reserves – Great Barrier Reef Marine Park Authority – Wet Tropics Management Authority		
			State area (ha)	**Number protected areas, hectares, and land percentage**
At state and territory level	Australian Capital Territory	• Australian Capital Territory Parks and Conservation Service	235,813	**46** 130,214 ha **(55.22%)**
	New South Wales	• Department of Environment and Conservation's Division of: Parks and Wildlife • State Forests	80,121,268	**925** 7,293,630 ha **(9.10%)**
	Northern Territory	• Parks and Wildlife Commission	134,778,762	**81** 25,129,386 ha **(18.64%)**
	Queensland	• **Environmental Protection Authority (EPA)**'s Division of: **Queensland Parks and Wildlife Service (QPWS)** • Department of Natural Resources and Mines	172,973,671	**1086** 14,108,222 ha **(10.26%)**
	South Australia	• Department for Environment and Heritage	98,422,137	**1995** 29,394,607 ha **(29.87%)**
	Tasmania	• Tasmanian Parks and Wildlife Service	6,840,133	**1524** 3,015,707 ha **(44.09%)**
	Victoria	• Department of Natural Resources and Environment • Parks Victoria	22,754,364	**3056** 4,012,124 ha **(17.63%)**
	Western Australia	• Department of Conservation and Land Management	252,700,808	**1607** 54,375,439 ha **(21.52%)**
At local level	Municipalities/Districts	Management of specific district protected areas: wetlands, river corridors, and bushland reserves by local government agencies (e.g. Councils) which are usually directed/guided by pertinent state or territory legislation and, or, local law		

Source Adapted from Parkin (2006), and Worboys et al. (2001), with additional information obtained online in the government agencies and reports, among them Department of Environment, Australia Government, CAPAD 2014

visitors' management as crucial to park management. How much is too much for parks to accommodate visitors? As mentioned by Manning (2002), "the working hypothesis was that increasing numbers of visitors causes greater environmental impact as measured by soil compaction, destruction of vegetation, and related variables" (p. 307). A CRC Report prepared by Higginbottom and Buckley (2003) has a thorough study and data on terrestrial wildlife viewing in Australia. Fredline (2007) also makes her contributions by assessing the domestic market for wildlife tourism in Australia; the study was also concerned with the wildlife tourism behaviour and visitors' attitudes toward animals.

The notions of national parks have been the mainstay of nature conservation (Hockings 2000, 2003). It was only three decades ago, in the 1980s, that the idea of protected areas became evocative as a system for Parks (McNeely and Miller 1984): that is, Parks being perceived as a place of special attributes and assets to be preserved and to be used for recreational, educational, and scientific purposes (Parkin 2006, p. 6; Hockings 2000, 2003). According to the Guidelines for Protected Area Management Categories (IUCN 1994), a 'National Park' is defined as a "protected area managed mainly for ecosystem conservation and recreation [which can] provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible". A study report produced by Higginbottom et al. (2001a, b, p. ii; iii) identified at that specific year some of the direct

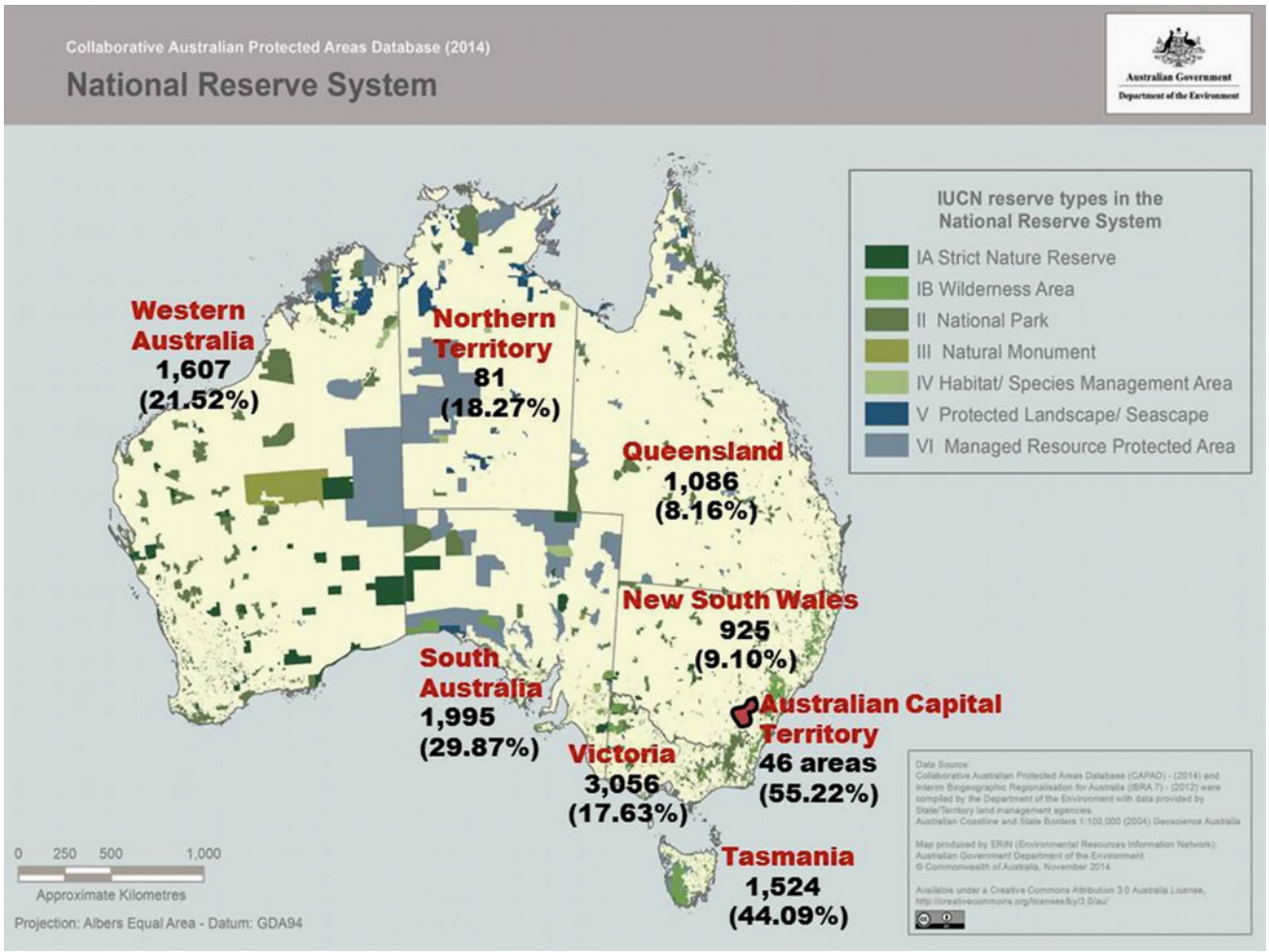


Fig. 8.1 Map of protected areas under the Australian IUCN classification in the National Reserve System (NRS) and the percentage of them compared to an overall State or Territory area. *Source* Adapted from the, Collaborative Australian Protected Areas Database (2014), Department of Environment, Australian Government. The original image was produced by ERIN (Environmental Resources Information Network), and is available under a Creative Commons Attribution 3.0 Australia License, November 2014. To note: For effects of citation, check for official updated percentages and figures directly on official gov. reports, websites, etc

positive impacts of wildlife tourism on wildlife regarding the Australian context:

- Government-owned wildlife tourism attractions and activities in Australia […] provide significant financial input into conservation in a few instances;
- Wildlife tourism appears to have led to some small-scale shifts towards more conservation-oriented land-use and wildlife management practices outside of protected areas;
- Wildlife tourism is associated with significant practical contributions to conservation;
- The nature and magnitude of costs and benefits of wildlife tourism to wildlife will vary according to many factors such as type of tourism activity, vulnerability of the wildlife population, effectiveness of interpretation, and conservation ethic of the operator.

In the literature, the role of park rangers for visitors' environmental learning is still scarce; somehow neglected, not fully developed, and it demands a more comprehensive investigation particularly with regards the relevance of including 'educational activities' and 'pro-conservationist messages' as part of the environmental-oriented attractions (Fig. 8.2). Mostly, the problem lies in the complexity of delivering 'environmental interpretation' at a managerial level in the parks, and the set of competences required for a successful and interactive delivery with visitors. In Parks, it is common that environmental interpretation and education is delivered by guides, educators, and volunteers, rather than the rangers themselves, who are more committed to conservation work and park maintenance and monitoring, rather than playing an educational role presenting natural assets to visitors. Notwithstanding, in Australia "the magnitude of benefits to wildlife associated with

education provided as part of wildlife tourism are unknown" (Higginbottom et al. 2001a, b, p. iii).

In Australia, the report Best Practice in Park Interpretation and Education, released in 1999, prepared by the ANZECC Working Group on National Park and Protected Area Management, Department of Natural Resources and Environment, Victoria, pointed out the complexity of developing and delivering 'educational activities' by rangers; the report provides a guideline for actions and policies for strengthening environmental education and interpretation as part of the managers' task and visitors' experience in the Parks. According to the report,

> Managers of national parks and protected areas have challenging responsibilities in regard to interpretation and education. Conserving natural and cultural resources and providing for visitor recreation are often the largest and most conspicuous management tasks […] interpretation and education are generally minor activities in terms of the resources employed [human resources, the rangers] yet important […] Good practitioners in this field must be part ecologist, part historian, part anthropologist, part artist and story-teller, and part market researcher. Increasingly they must also be partnership managers assisting providers such as educational institutions or tourism organisations rather than [the rangers, managers] always delivering services direct (pp. 9–11).

Most visitors have a fundamental need for information about the places they visit, and while most visitors do not visit to learn about conservation per se, it is clear that many seek to improve their knowledge about the natural and cultural values of an area (Sharpe 1982; Beaumont 1999). Yet, the human/nature dimension of protected area management, how to conserve and protect the natural resource while at the same time promoting available educational and recreational opportunities, is among the greatest challenges faced by many protected area agencies (Parkin 2006, p. 45). At an Institutional level, it seems there is an effort by the government agencies to implement educational activities, though with an emphasis on 'visitor education' for conservationist goals. Efforts also have been made to create effective instruments to manage the Parks, including monitoring strategies.

In many instances visitor education is used alongside techniques such as site hardening, closures, signage and regulation as park management techniques to lessen the likelihood of negative environmental impacts caused by visitation to the protected area estate (Beckmann 1988, 1991; Hammit and Cole 1998; Higginbottom 2004). At the

Fig. 8.2 A ranger beginning a guided tour at the Rainforest Nature Park, Kuranda, Cairns Region, Queensland, Australia. *Source* Authors' own work, 2015

same time, the traditional role of visitor education has been to provide information to increase public awareness and appreciation of natural resources (Carter 2001; Sharpe 1982; Anderson et al. 1998; O'Neill et al. 2004) used effectively, it (visitor education) can enhance the quality off the visitor experience and address management issues such as:

- Protecting fragile resources (by directing visitors to other areas);
- Reducing intentional and unintentional vandalism;
- Reducing accidents by explaining unusual dangers;
- Increasing understanding of, and compliance with, management activities;
- Increasing knowledge of land management objectives (reservation, conservation);
  (Adapted from Beckmann 1991, p. 41, and Moscardo 1999, pp. 8–14, apud Parkin, 2006, p. 46).

In Queensland, the management planning process for protected areas, like many other states and territories in Australia, is based on classification (NCAct 1992, p. 14) and prescribed management principles (NCAct 1992, pp. 15–27). The Queensland Parks and Wildlife Service (QPWS), a Division of the Queensland Government's Environmental Protection Agency, is the State government agency responsible for the administration and management of protected areas under the Nature Conservation Act (1992), which is the principal piece of legislation that guides the administration and management of protected areas in Queensland (Parkin 2006, p. 82), Marine Parks Act (1984), Recreation Areas Management Act (1988), Brisbane Forest Park Act (1970) and Forestry Act (1959). The QPWS's primary purpose is to implement the Government's environmental objectives to ensure the protection, conservation and proper management of Queensland's natural and cultural values (Qld Govt 2001).

The QPWS emboldens people to visit and enjoy the protected areas through active nature-based outdoor recreational activities as long as they do not conflict with conservation and preservation of the sites, including sacred, cultural, heritage settings (Batt 2004, as cited in Parkin (2006)). In order to guarantee that visitors will behave in a proper sustainable way in the protected areas, the QPWS has run visitor education programmes to raise awareness, direct and influence visitors' behaviour, attitudes, and perceptions aiming to minimise the negative recreational impacts in those sensitive areas (Bauchop and Parkin 2000; Higginbottom 2004), and the framework used to this purpose is provided by the organisation's interpretation and education strategy (I&E Strategy) (QPWS 2000). The goal of the I&E strategy is to guide the visitor education activities performed by the QPWS, its interpreters and park rangers in the Queensland's parks and reserves.

8.3 The Role of Rangers and Guides in Promoting Environmental Interpretation and Education in National Parks in Australia

Park rangers play a key role in conservation and visitor management in protected areas. They manage Australia's network of parks and reserves making efforts to conserve the nation's biodiversity. For Howard (2013), "an understanding of the role of park rangers and the professional skills they require is therefore also important for future workforce capability" (242). But, how to better define a park ranger? Howard (2013) explains that "park rangers are middle managers who are primarily responsible for implementing the policies and plans developed by the main office" (p. 243).

The Park rangers and managers are responsible for looking after 1086 protected areas in Queensland, covering 14,108,222 ha which represents 8.16% of the overall land of the State (refer to Fig. 8.1; Table 8.1) (Department of Environment, Australian Government). The rangers need to ensure conservation, protection, resource and visitor management in the 213 National and Regional Parks in Queensland, which covers a landmass of 6,661,888 ha, they are also in charge of managing seven National Parks Scientific with an overall area of 52,181 ha which represents 0.03% of the State.

By reviewing the literature it was noted that the research on the skills and role of park rangers is ample, and this career tracks a set of specific abilities (Burns and McInermey 2010). One of the most recent publications is the research of Howard (2013) on the role of park rangers and the skills they need for managing the natural environment. Day (1995), for example, investigated the needed skills and training for conservation staff, and pointed out 50 skills necessary for becoming a park ranger. McGahan and Bassett (1999) identified the need of training and improved skills for managers, including rangers, in five main areas, as a way of "improving ranger knowledge and understanding of geography, climate, natural ecosystems, wildlife and plants; nature interpretation and the production and use of communications materials and outreach equipment; organisation of training, workshops, youth camps and other environmental education activities; public relations and public speaking; and knowledge of local languages and cultures, community relations and community participation" (p. 72).

To date, there is still little research on the interpretative and educational role of park rangers in National Parks in

Australia, particularly Queensland region. Most existing information in this field can be found in the documents and reports of Australian government agencies, for example, the Interpretation and Education Strategy 2000–2002, internal document, Queensland Parks and Wildlife Service, Brisbane, Qld.; Statewide Interpretation Workshop (5–8 March 2001) Report, internal document; Queensland Parks and Wildlife Service, Brisbane, Qld.; Interpretation and Community Education Situation Report (1999–2001), internal document, Queensland Parks and Wildlife Service, Brisbane, Qld.; QPWS interpretative Planning Handbook, internal document, Queensland Parks and Wildlife Service, Brisbane, Qld.; QPWS Community and Education Manual, internal document, Queensland Parks and Wildlife Service, Brisbane, Qld.; Master Plan for Queensland's Parks Systems 2001, The State of Queensland, Environmental Protection Agency, Brisbane, Qld.; and the Queensland Department of Environment and Heritage, 1998a, Public Contact Manual—A Guide to Effective Community Education, Heritage Interpretation and Extension, unpublished document.

In the Northern Territory, the Parks and Wildlife Commission classifies the rangers into two main groups: Park rangers and Wildlife rangers, and emphasises that their work is "highly rewarding", never the same, never a routine by dealing with outdoor issues, for example, wildlife protection. Being a ranger implies dealing with challenges. According to the Northern Territory Commission, an ideal ranger is expected to have a set of skills: a specific qualification (e.g. a tertiary education in Natural Resource and, or, Park Management, Conservation, Land Management, or, related fields), pertinent management experience and empathy traits, such as high levels of motivation, disposition to handle wildlife, and communication skills to manage human resources, including visitors and staff, etc.

Katz (1974) argued that people need certain skills to perform as managers, in which the rangers' role fits in, and suggested three encompassing categories of skills regarding a managerial work: technical, human, and conceptual. The technical skills are those necessary to accomplish or understand the specific kind of work being done in an organisation; the human skills are related to the ability to communicate with and understand other people; and the conceptual skills are those abilities to think abstractly and logically as part of the process of innovating and integrating work (as cited in Howard 2013, pp. 243–244).

The Parks and Wildlife Commission Northern Territory sets the role of rangers into four dimensions: environmental management and protection, visitor management and services, wildlife management, and law enforcement. As for visitors' management and services, some of the main tasks are: the delivery of "face to face interpretative activities such as guided walks and talks, slide shows and junior ranger activities to promote understanding and appreciation of natural and cultural aspects of…Parks", and the representation of Parks and Wildlife on a daily basis with interaction with park visitors to let them know about the park rules and regulations, as well as conducting "law enforcement duties". As for wildlife management in the Northern Territory, the rangers have the following duties:

- Taking part in problem wildlife control programs and providing advice to others.
- Providing technical assistance to other departments in regards to feral animal management.
- Monitoring the snake removal hot-line, providing the appropriate advice, removal and relocation of the animals as required.
- Monitoring the crocodile sightings hot-line and taking appropriate action when sightings or other information is reported.
- Trapping, capturing and removing crocodiles.
- Maintaining crocodile traps and equipment.
- Assisting with sample collections from crocodiles and other wildlife for research.
- Surveying crocodile and waterfowl populations by boat and plane.
- Assisting with scientific surveys and the protection of threatened and endangered species populations.
- Working with other organisations in relation to mistreated or problem animals.
- Community engagement.
- Providing information to people, businesses and school groups in relation to native wildlife, pest animals, permits and wildlife crime.

A publication in the website of Parks Victoria has a section on the role and responsibilities of a park ranger. The main responsibilities are divided into two major duty groups: conservation and recreation. These aspects are reorganised into subcategories to facilitate the understanding of how complex is the role of a ranger; and the multiple tasks and duties the rangers are engaged on a daily basis (refer to Table 8.2).

8.4 National Parks, Rangers and Visitors Management Tools: Visitor Education

Page (2011) lists a number of techniques of how to manage visitors' impacts through regulation and restrictions. According to him, the most salient techniques cited in the literature are: regulating access by area (sacred sites, indigenous lands), by transport (vehicle-free environments), by visitor numbers and group size, by types of visitors permitted (discouraging specific groups trough segmented marketing), regulating visitor behaviour and equipment use,

Table 8.2 Conservationist and recreational responsibilities of rangers in park management

Rangers' Role	Conservation (Protection and maintenance of natural & cultural assets in Parks)
General conservationist role of wildlife and flora	• Protection, enhancement and management of natural assets • Identify and protect populations of threatened or endangered animals • Identifying weeds and pest animals and eradicate or control those that hold the most threat to native plants and animals • Work with volunteers on projects such as weed control, maintaining tracks and other infrastructure
Burning prevention	• Organise and conduct prescribed burning operations Assisting with fire suppression (fire-fighting) for fires on public land throughout the state
Heritage & cultural protection & maintenance	• Protection, enhancement and management of cultural assets • Promote and maintain historic assets, such as gold mining sites and historic huts • Develop co-operative relationships with local indigenous groups
Scientific and business activities management	• Issue permits and oversee researchers studying within the park • Monitor and issue permits to businesses operating within parks, such as, tour operators, ski resort operators, hydroelectricity, cafés and beekeeping
Rangers' Role	**Recreation (Helping visitors to enjoy and understand Parks)**
General role in Recreation	• Implementation and management of projects, programs and contracts • On a broader level, the role of a park ranger involves extensive planning, researching, strategic thinking and people management to effectively balance conservation and recreational values of each asset.
Delivery of educational activities for visitors	• Delivery of interpretation and education services including guided tours, demonstrations and talks
Developing visitors' facilities and recreational/ adventure settings	• Maintain and develop visitor facilities such as picnic areas, camping areas and toilets • Create and maintain trails for hikers, mountain bike riders, four-wheel driving, etc.
Visitors' safety	• Respond to emergency situations such as 'Search and Rescue'
Supporting human resources management	• Management and development of staff, volunteers, contractors & work experience students

Source Ismar Lima (2015), adapted from Parks Victoria, Role of a Park ranger. Available online at http://parkweb.vic.gov.au/learn/informationfor-students/managing-our-parks/role-of-a-park-ranger

and by promoting preventive modifications of sites such as pathways, boardwalks, that can direct visitors in natural settings; and the provision of interpretation and education schemes for visitors (Page 2011, p. 320).

Visitor education has been regarded as an important park management tool by Australian Park agencies (Parkin 2006; Marion and Reid 2007; Brown et al. 2010). Visitor education seeks to open opportunities for enhanced visitors' experiences while seeking to minimise related negative impacts to natural settings in protected areas (Green and Higginbottom 2001; Higginbottom 2004; Weiler and Black 2015). Some educational programmes have been created in an attempt to influence visitors' behaviour leading them into more pro-conservationist and pro-environmental attitudes while strengthening conservation actions in parks. These educational programmes, usually managed by park rangers, employ interpretation, talks, story-telling, and demonstration techniques as the means to address visitor-related damages or impacts on cultural and natural assets (de Lima 2016a). According to Marion and Reid (2007), "findings reveal that most of the visitor education efforts evaluated did effectively alter visitor knowledge, behaviour and/or resource and social conditions in the intended direction" (p. 5).

The use of visitor education as a park management tool is part of the "sustaining recreational and tourism opportunities" element, a meaningful method to spur on people's awareness and engagement in conservation, while providing "visitors with facilities…constructed and maintained to meet safety standards…with information…of the hazards in parks" (EPA 2001). According to EPA (1999), the use of environmental education and interpretative services to serve to put in evidence the values of Parks and of other protected areas in Queensland in terms of community awareness and conservation outcomes.

In general, 'visitor education' programmes centred on visitors' safety and awareness are worldwide designed as the main tools for nature protection by pertinent environmental agencies, and these educational programmes differ from environmental education programmes that are much broader in their targets (Parkin 2006, p. 11). Such programmes not only raise visitor awareness about the natural and cultural settings and resources, but also aim at developing a meaningful understanding about nature, its biomes, flora and fauna, and its ecosystems for the visitors. The content approaches and emphases may hold a great distinction between both visitor educational programmes; they have distinct goals, but employ similar interpretative and mediatory techniques. For Morgan and Soucy (2006), non-formal environmental education oftentimes implies natural resource communication at park locations, and both terms 'non-formal environmental education' and 'environmental interpretation' are close in meanings and effects; thus, in the literature sometimes they are used interchangeably (p. 596).

Even more complex is the interpretative and educational role of the rangers in visitor management. This is the main issue to be discussed in the paper. Within the tourism literature, terms used are 'tour guide', 'tourist guide', 'tour leader', 'tour manager', 'tour escort', and 'courier' (Weiler and Black 2015, p. 2), and even 'tour conductor'. There is a sort of consensus among researchers about the instrumental (leadership) role of the guide in order to keep a tour running successfully for the visitors in terms of safety, logistics, and certainly as individuals in charge of the mediation and interpretation of content and sites, "this in turn has drawn attention to the importance of the communicative competency of guides, including the application of best practice principles in interpretation and intercultural communication" (Weiler and Black 2015, p. 2), which, are also elements of a successful tourism operation.

8.5 Environmental Interpretation and Education: A Challenging Task for Rangers and Guides

As explained by Beck and Cable (2002), interpretation is a communicational process which helps to interconnect the visitors to the [cultural, nature] resource [or place]: thus it is visitor centred. For example, interpretation is habitually perceived as effective in terms of managing the interactional processes between 'visitors' and 'wildlife' because it can result in levels of environmental awareness with an augmented view of a conservation ethic (Beckmann 1988, 1991; Moscardo 1998; Howard 2013), and Orams (1996) emphatically states that interpretation [in guiding] is the most effective strategy for managing wildlife encounters. Interpretation should provoke visitors to reflect and to connect with cultural and natural elements of visited sites, to local people, culture, artefacts, and to historical events to the extent it can fill them with information which can lead to thoughtfulness about care and of stewardship (Weiler and Black 2015, p. 18). There is thus a distinctive difference between interpretation and information; the latter refers just to communication of facts; it gives plain facts; conversely, "interpretation can provoke ideas, perhaps even jolt people into a completely new understanding of what they have come to see" (Carter 2001).

As McIntyre et al. (2014) explain it, "interpretation is a mission-based communication process that forges emotional and intellectual connections between the interests of the audience and the meanings inherent in the resource", and in order to effectively approach ecological themes and deliver the content to visitors, it is essential to understand who the audience is and what they are looking for, so interpretation can become meaningful and fulfil expectations. Sometimes, the visitors only wish to contemplate and observe nature.

A significant number of publications on interpretation and communication processes are based on Freeman Tilden six interpretative principles of 1957; the foundations and gifts of interpretation. Environmental interpretation and environmental education: what is the difference? According to Veverka (2001, 2014),

> Environmental Education (either the formal education process, or the hopeful result of a program or exhibit), can be presented in either an informational "instructional" approach or using an interpretative approach. Remember, interpretation is a communication process. If the process works in presenting and translating the information about the environment in a way that is meaningful for the audience, then environmental "education" occurs…The interpretative communication process can be used for interpreting anything, any subject. If the interpretative communication is effective, then "education" can occur about that subject. Interpretation is an objective driven, and…audience focused process that looks for results (the accomplishment of stated objectives).

For Ward and Wilkinson (2006), it is highly relevant to distinguish the essence of interpretation from education in terms of values and purposes. According to them, the main aspect that separates interpretation from education, including environmental education, is the available time frame for delivering a content to the audience. "In education, there is typically a longer time frame and repeated exposure through which to build knowledge and learning. With interpretation [there is] one opportunity to achieve [this] goal…of short time…but instead should serve as a catalyst for learning" (p. 21). By taking this understanding into account, it is possible to assert that 'environmental interpretation' is the main tool to promote and achieve environmental education (de Lima 2011, 2016a, b); and the latter is dependent on an effective interpretation; they are disconnected for educational purposes. Tilden (1957) mentioned that environmental interpretation is "an educational activity which aims to reveal meanings and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information" (p. 8). Ham (1992), in his book entitled, Environmental Interpretation: A Practical Guide for People with Big Ideas and Small Budgets, explains 'environmental interpretation' as the use of techniques to communicate wonders and complexities of nature science to common people, that is, "translating the technical language of nature science or related fields into terms and ideas that people who aren't scientists can readily understand. And it involves doing it in a way that's entertaining and interesting to these people", and interpreters—nature guides—play a pivotal role for achieving it.

A guide is a type of individual in charge of using environmental interpretation to achieve levels of environmental education through a interwork which demands skills and knowledge to escort groups of visitors in venues, places and sites of touristic interest such as natural areas, historic buildings, zoos, sanctuaries, parks, museums; thus, they are expected to provide interpretation of natural and cultural assets "in an inspiring and entertaining manner" (Weiler and Black 2015, p. 3), and this also applies to rangers in parks in charge of guiding visitors. As part of the process of presenting natural and cultural settings, Mediation is thus critical for touching one's perception and feeling in regard to specific themes and topics in hosting places, particularly in terms of post-visit postures, "the strategic use of tour guides to influence on-site behaviour and change post-visit attitudes and behaviours might also be considered as mediation" (Weiler 2015, p. 35). Tour guiding (or group guiding by rangers) commonly demands eclectical skill, abilities and training in introducing and mediating culture, places, ecosystems, landscapes, and local people attributes. Rangers involved in guiding in Parks are expected to hold the same attributes and skills as those of outsourced tour guides, and also they are expected to have a set of knowledge and skills specific for working in protected areas as already presented in Table 8.1. For acting in the parks, usually contracted skilled rangers are allowed and, or, authorised guides and tour companies. But, in general, for guiding and delivering meaningful biofacts to visitors, a skilled, knowledgeable and trained person in this field can carry on the guiding tasks; this person can be an environmentalist, biologist, a school teacher, a instruction, a tutor, etc. A skilled guide usually gathers not only effective communicational abilities, but at least some major ecological and biological knowledge of the field, areas, wildlife the person is in charge of providing environmental interpretation and education (de Lima 2016a, b).

Concerned with the role of guides and the benefits and enhancement they could provide for visitors, local stakeholders, and destination sites, Cohen (1985) presented two conceptual spheres with course of action for the guides: tour management in which guides have an instrumental (leadership) role in organizing and managing group(s); and the experience management in which guides have as a role to facilitate visitors' engagement and learning (mediation) (Refer to Table 8.2). In 1993, Weiler and Davis (1993) advanced the discussion by adding a third sphere to Cohen's model with a focus on the role of the guide (or of the ranger) in a site/resource management. Cohen's (1985) and Weiler and Davis's (1993) "conceptual frameworks have stood the test of time in drawing attention to both the diversity of guiding roles that are common to all contexts and types of tour guiding, and the specialist roles that ecotour/nature guides are required to perform" (p. 25).

By taking into account the three spheres, a framework is proposed in this paper aiming to examine the roles of guides (or of rangers in guided tours) and the relevance of guiding, that is, instrumental (tour management), mediatory (experience management), and interpretative (resource management)

Table 8.3 The three key spheres of tour guiding and the roles of a contemporary tour guide, including the rangers' role in guiding, visitor management, and interpretation

Sphere 1: Group management	**Instrumental (leadership) roles** focused on organising and managing the group
Sphere 2: Experience management	**Mediatory roles** focused on facilitating individual's engagement and learning
Sphere 3: Resource/Site management	**Interpretative and role-modelling roles** focused on the sustainability of host environments, communities and destinations

Source Adapted from Weiler and Black (2015, p. 28)

(Table 8.3). In regard to 'resource management' it can refer to both cultural/heritage and natural resources. Rangers in charge of guided tours or of visitor education can use interpretation or mediation to explain or connect visitors to some aspects of an Indigenous community, or, Indigenous lifestyle and traditional knowledge (de Lima 2016a, b).

Within the perspective of these three spheres, guides can add value to a visitor experience and to a local site, or destination, contributing to the conservation process. That is, "nature-based tour guides also encourage participants to reduce their impacts on-site, and they facilitate a change in values towards long-term conservation" (Weiler and Black 2015). The guides can also introduce outsiders to a specific culture providing specific information, raising awareness of and respect for Indigenous peoples. As an example, bush tucker or a wildlife encounter guided (led and mediated) by Indigenous people can be a fascinating experience in getting to know about a local forested area by using the senses. Guiding implies a multitude of ways for acquiring knowledge.

Jennings and Weiler (2006) explain that guides can mediate a visitors' connection to localities and local issues to the extent that they can enhance or detract them from their experience, either facilitating or inhibiting outcomes, because the guides perform both an instrumental and mediatory role. Weiler and Black (2015) provide four domains in a framework to examine the mediatory role of guides, and they make a distinction between mediation and interpretation, in that 'interpretation' is a role in itself with a collection of techniques necessary for mediation by using interpretative strategies such as analogies, anecdotes, narratives, storytelling, metaphors, and even non-verbal communication such as artefacts and experiencing through the senses (touching, listening, tasting, smelling, seeing) (Cohen 1985; Moscardo 1998; Colquhoun 2005; Jennings and Weiler 2006; Weiler and Davis 1993).

Put simply, there is no mediation without interpretation, because the techniques used in the interpretation can help "visitors to understand and feel empathy towards objects, persons, sites or environments" (Weiler and Black 2015, p. 35), it is the guide's role to get the visitors "under the skin of visited destinations" (McGrath 2007, p. 376), and the mediation role is all-encompassing in regard to enhancing a visitor's experience as pointed out by Weiler and Black (2015): mediating/brokering physical access; mediating/brokering encounters (interactions); mediating/brokering understanding (intellectual access); and mediating/brokering empathy (emotional access).

In order to satisfactorily act as a guide, a set of competences are necessary in guiding, particularly in dealing with heterogeneous, multicultural visitors. Such competences are: fluency in the visitors' language; a local culturally knowledgeable person; social-interpersonal skills; expression and demonstration of cultural pride; discernment in what is culturally appropriate to share; and engaging in two-way communication (Weiler and Black 2015, p. 65). For Indigenous guides, culturally sensitive issues can be better approached and shared with visitors because the guides have a local cultural upbringing which can position them as genuine knowledge mediators of their own culture.

In regard to the role of guides and natural resource management, the cases examined in the literature reveal that the guides face restrictions in achieving wide-ranging conservation outcomes. Most of their roles in terms of nature management rest on reducing on-site impacts by delivering 'conservation messages' to visitors while putting emphasis on their conduct at the moment of having contact with natural assets either a forest or a reef (de Lima 2016a, b). In their studies, Medio et al. (1997) bring up the role of guides in mitigating impacts on coral reefs by divers or snorkellers.

The guides can play an interventionist role in guiding visitors on the trails by working with them in order to avoid excessive noise, off-track walks, collection or removal of natural elements, including those of cultural value such as sacred rocks, petrified wood, etc. (Littlefair and Buckley 2008), and certainly "guided tours and roving interpretation rangers [can]… convey important conservation messages to visitors, helping them to enjoy, connect with and value our significant and special places" (Colquhoun 2005, p. 7). In their literature review, Zeppel and Muloin (2008) stated that visitors who are exposed to environmental messages are reported to have higher levels of pro-conservation behaviour, and are more environmentally cognizant.

Some evidence shows that a tour guide who makes himself/herself authoritatively respected can lead visitors into more responsible behaviour during their stay in natural areas (Littlefair and Buckley 2008). By taking into account

Fig. 8.3 A ranger in action at the Rainforest Nature Park, Kuranda, Cairns Region, Australia: Enhancing visitors' experiences and learning through interpretative and demonstration techniques (Dimension I). *Source* Ismar Lima, field work in Cairns, Queensland, Australia, 2015

these facts, Indigenous tourism operators and Indigenous guides can contribute to reducing impacts in the visited areas: controlling visitor access to sites, using licensing, law enforcement, and observing regulations restricting the use of renewable and non-renewable resources by the tourism industry (Weiler and Black 2015; de Lima 2016a, b). The three dimensions in which guides can get involved in helping to encourage sustainability (Weiler and Black 2015, pp. 72–75), are as follows:

- *Dimension 1*: *Enhancing* visitors' understanding and valuing of a site, communities, cultures and environments.
- *Dimension 2*: *Influencing and monitoring* visitors' behaviours, en route, on-site and at destinations.
- *Dimension 3*: *Fostering* visitors' *post-visit*, pro-environmental and pro-heritage conservation attitudes and behaviours.

A conservationist role of guides as mediators has limitations, and it happens because sustainability outcomes in terms of conservation and nature/heritage protection are largely under the responsibility of protected area managers and of local/regional government agencies. The creation of pro-conservationist policies is something out of the scope of a guide role, "the guiding profession, let alone an individual guide, may thus feel relatively powerless to make a difference in contributing to the sustainability of a particular activity, tour, business, community, industry or environment" (Weiler 2013, pp. 14–15). There are however several ways through which the park rangers can contribute to address sustainability targets through guiding and interpretative talks, and the list includes the enhancement of the visitors' understanding and valuing of communities, cultures and environments, as well as purposeful actions aiming at influencing visitors' behaviour on-site (Fig. 8.3).

8.6 The Need of Interpretative Planning and Strategies: Addressing Messages on Wildlife

Interpretative planning is a first step in a planning and design process for supporting Institutions in their informal learning-based programmes and actions where interpretation has a critical role to deliver biofacts, messages, and experiences to visitors, such as in zoos, nature centres, heritage sites, parks and wildlife sanctuaries and reserves, etc.; it is above all a decision-making process that binds the most effective ways to deliver a content to a targeted audience; the planning consists of integrating the available nature resources (fauna, flora, etc.), the management demands and the visitor informative (learning) expectations. For Veverka (1998, 2001, 2014), interpretative planning is a process that identifies and describes significant visitor experiences in a resource-based recreation area, and recommends ways to provide, encourage, sustain, facilitate or otherwise assist those experiences (Veverka 1998, 2001, 2014). Interpretation of informal learning institutions focuses particularly on relating content in a meaningful manner to a visitor's self experience, and for achieving this goal, usually it is sought to provoke emotion, thought or further inquiries into a subject, getting the attention and engagement of visitors for information transfer and knowledge building, and most interpretative plans are based on a thematic approach to interpretation…to communicate to various audiences (Brochu 2003; Coghland and Kim 2012; Veverka 2014).

Interpretative planning helps Institutions, organisations and companies to organise environmental interpretation and education opportunities for visitors, so they can explore the nooks and crannies of natural settings and their wildlife; to learn key information, biofacts and details of a natural world through interpreters, guides and rangers mediation. An interpretative plan sets a communicational process, through which valuable information—meanings and relationships of the natural world—, are disclosed to visitors through experiences by combining techniques and strategies, which include the use of objects, artefacts, props (Fa et al. 2011), etc., so they can take the most as a learning moment in natural settings, e.g., zoos, parks, etc. (Veverka 2001; AldrichPears Associates). "The Experience" is what visitors take from a park. The provision of opportunities for visitors to interact with park resources in a manner that is both safe for visitors while leaving the resources unimpaired is unimpaired what has been termed "visitor experience planning" (Dave Dame, cited in Harpers Ferry Center 1998, p. 2), and this is the core of park planning and development.

For elaborating any interpretative plan, it is utterly necessary a familiarisation with the pertinent site or natural setting; it is worth noting that just an occasional visit hardly provides the means to gain knowledge enough to outline the basics of an interpretative planning; conversely, it usually requires a detailed physical exploration as well as contacts and discussions with key stakeholders. For example, the Interpretation Master Plan for the Angel Island State Park of 2012, an area managed by California State Parks, the largest island in San Francisco Bay with 740 acres and six miles of shoreline, considers the geology, climate, hydrology, and biology—the island's natural resources—as the foundation for interpretative services at the park with a focus on ecological knowledge transfer. Also it is relevant to cite the guidelines and reports used in Queensland, Australia, for visitor education and Park interpretation, among them: the QNPWS Interpretation Manual (1984), a first step towards documenting the Service's interpretation philosophy and activities; the QPWS interpretative Planning Handbook: Connecting people with nature through interpretation, extension and community education (2001). The Handbook provides a step-by-step guide to interpretative planning from individual to state-wide strategic planning, and was developed to assist interpreters and educators, e.g. the Park rangers and managers, to write and implement strategic plans appropriate for the demands of a specific area, community, conservation or resource issues (Parkin 2006, pp. 103–104).

For a consistent plan, it is necessary to gather all information and data; by knowing a site better it is possible to have a thorough mental image of the area, its layout, the arrangement of its physical features, its natural resources; the wildlife; the local ecosystem with its flora and fauna, and related phenomena, and how visitors access and use it. This will help planners to comprehensively understand who uses it, why they use it, what they like about it, and the type of improvements that should take place as priority for improving interpretation and educational outcomes, for example, in a park, wildlife sanctuary, or zoo.

An interpretative plan furnishes planners, interpreters, guides, and other field-related people with instructions and suggestions on important elements to be considered in a planning process; consequently, they can develop content and strategies to deliver biofacts, for example. The elaboration of an interpretative plan has many different stages and phases, and the person needs to take into account the scales of its application and use, for example, from a macro perspective (a whole region) to a specific setting (a single display). Within a National Park scope, there are usually a park-wide interpretation strategies; local interpretative plans for hot-spot areas, as well as individual interpretative plans for each visitor centre (Carter 2001). By dealing with visitors of all ages, particularly children, school-visitors, McIntyre et al. (2014) alert that interpretation should be enjoyable and entertaining as an essential quality. In order to have it, they suggest the use of a conversational tone; to avoid reading from notes; to incorporate humour, music, sounds, two-way

communication; incorporate objects (biofacts); use comparisons, analogies, and metaphors.

The visitors are interested in the wildlife, but not in overly-serious lectures. The role of interpreters is to convey information in ways that allow visitors to have fun while they are learning; a recreational learning experience is one where the visitor attends or participates in a program through which the person can gain both scientific and entertaining knowledge (McIntyre et al. 2014; de Lima 2016a, b). In a nutshell, the basic principles of interpretation are: to provoke, to relate, to reveal, to address the whole; and, to strive for message unity (Veverka 2001, 2014). In order to achieve it, it is necessary to consider combining multiple sources of interpretation to repeat the interpretative message in nature-based tourism; thus, the interpreters should consider interpretative layerings at an attraction by using a variety of interpretative sources on visitors' understanding of the attraction (Coghlan and Kim 2012), and of the wildlife. In 2011, Education Scotland, an Executive Agency of the Scottish Government, released a practical guide for outdoor learning, in which some general benefits from taking learning outdoors within and across curriculum areas are cited (Education Scotland 2011, p. 7); it highlights that,

- connections made experientially with the real world help to develop skills, knowledge and understanding in a meaningful context;
- the outdoor environments and surroundings act as a rich stimulus for creative thinking and learning. This affords opportunities for challenge, enquiry, critical thinking and reflection;
- the multi-sensory experience outdoors helps children and young people to retain knowledge more effectively;
- learning in a less structured environment can provide a different learning experience; being outdoors can be a more relaxing learning experience for many learners.

With an increasing emphasis and opportunities for learning outdoors about ecological and biological aspects of the wildlife and ecosystem, an educational nature-based tourism takes shape and can advance public understanding on the human and nature relations and interactions. The 'learning component' in tourism activities, either visiting a Park or visiting a zoo, adds great value to people's experiences and to tourism itself; visitors as learners have an opportunity to make their visits and stay a more meaningful self-experience. This can include, for example, the participation in interactive and sensory activities mediated by guides or interpreters. The visitors can also choose to participate in a more hands-on and open-air learning tourism with bush tucker and bush medicine, by combining it with Indigenous tourism, wildlife tourism and geotourism. In geoheritage areas, visitors have a chance to learn and understand about the natural landscapes and the character of a geopark (Newsome and Dowing 2010), and they also have a chance to better understand the fragile ecosystem and wildlife that are usually present in savannah and deserts. Geotourism can be an experience associated with wildlife tourism, by "integrating fun and geosciences through geotourism…as a strategy to attract more visitors" (Farsani et al. 2012). For example, to engage visitors in a bush tucker at Alice Springs Desert Park, in Australia, conducted by Aboriginal guides or rangers, to harvest and taste native bush foods, while enjoying the uniqueness of the largest sandstone rock, the Uluru, also known as Rock Ayers, and listening to native dream-time stories of the place and of the culture.

Table 8.4 shows some aspects that should be taking into account for planning environmental interpretation and education in the context of an outdoor recreation and educational nature-based tourism. The framework includes information on natural resources and guidance on topics suitable to different age ranges.

8.6.1 David Fleay's Wildlife Park: An Overview

David Fleay's is a wildlife park nestled just west of the Burleigh Heads, on Gold Coast, that allows visitor to "stroll through the tranquil surroundings to experience some of Queensland's most iconic natural habitats and meet the resident wildlife" […] (NPRSR, Queensland, online). The park was built from 1952 to 1983 and has played an important role in demonstrating the conservation initiatives of David Fleay, who established the property in 1951: a naturalist who became the first to breed platypus in captivity, and his concept was that rescued and threatened birds and other animals should be kept in conditions similar to their natural environment, if they cannot be in open ranges. Figure 8.4 shows an early picture of Fleay with a rescued floodwater baby platypus in hands for a very close kids' appreciation and getting the news with the creation of a "platypusary". The platypuses (*Ornithorhynchus anatinus*) are monotremes; some people regard them odd mammals; the females lay up to three eggs a time; the platypus has a flat bill like a duck, feet like an otter, a paddle-shaped tail like a beaver, and a furry body. The platypus is considered as one of the Australian wild species visitors should see during their visit to the country because of its uniqueness, however it is not an intention in this chapter to create a sort of hierarchy ranking the wildlife, but some species may have more tourist appeal than others; notwithstanding, all wild animals have their values, peculiarities and tourism attractiveness. Higginbottom and Buckley (2003) based on their study on terrestrial wildlife of Australia, recommended to increase the demand from domestic and international tourists to see a wide range of Australian wild animals in their natural settings,

Table 8.4 Approaches for environmental interpretation and education across ages in the context of outdoor recreation and educational nature-based tourism

Age range	Desirable topics and approaches	Not recommended topics	Interpreting topics across ages	
			Fauna (wild animals), flora, and ecosystems	Natural outdoor Settings / sites, zoos, sanctuaries (*Forests, Savannah, Deserts; Marine, River, Lake Environments, etc.*)
Birth to 3 years-old * ***Sensory***	* Animals are cool * Sensory experiences * Surrounding animals * Animals affections as family, moms, dads, babies	* Ecosystems (too abstract) * Life cycles (birth, death) * Endangered species * Environmental problems	* Imitation, mimesis: pretending some animal basic behaviours	* Listen to sounds of nature or of a site you are in and reproduce them (birds, frogs, water sounds, etc.)
4–7 years-old * *Sensory* * ***Empathy***	* Animal homes * Farm/domestic animals * Predators/prey * compare/contrast animals to self * Animal groups * Life cycles * Desirable environmental attitudes (recycling, reusing, turning off lights, etc.)	* Ecosystems (too abstract) * Endangered species * Environmental issues * Consequences of not behaving ecologically friendly (habitat loss, pollution, endangered species, etc.)	* Role play of animal's life and behaviour (hatch, stretch, chirp, eat, snuggles against mom, sleep, defense)	* Comparisons of humans to forest animals by using facial expressions, hands, body size, etc. * Nature-based play games * Nature discovery activities according to their age
8–11 years-old * *Sensory* * *Empathy* * ***Exploration***	* All of the above * Good environmental manners (tree-planting, habitat cleaning-up, etc.) * Ecosystems * Physical adaptations * Animal habitats and needs * Site-specific investigations and, or, observations * Cycles (life, water, etc.) * Basic notions on good and desirable environmental manners	* Dire consequences of not choosing and practising good ecological manners (human impacts on nature), e.g. avoid anything too depressing, frightening or gory	* Discuss animals' habitat and life cycle; to make comparisons among the animals or to people as a way to illustrate an issue/animal	* Build nature, biome, ecosystem models on the sand, on a paper, board, and present the various layers and animals that live in a site/place, e.g., forest * Nature-based play games * Nature discovery activities
12 and up *(Heterogeneous audience—young people and adults)* * *Sensory* * *Empathy* * *Exploration* * ***Action***	* Behavioural adaptations * Consequences of not being ecologically friendly, not not using good environmental manners * Ecosystem investigation with concrete experiences * Endangered species	* Most topics are appropriate, if presented in a sensitive manner; they should be preferably presented as a way of building a sense of affection and care for nature and its dwellers, and presenting problems and what we can do about them, but avoiding a sense of hopelessness	* Discuss wild animal habitats, ecosystem and flora, and try to engage the participants/visitors in any appropriate hands-on activity or game that is ecologically beneficial to nature	* Build nature, biome, ecosystem models * Nature-based play games * Nature discovery activities * Tree species learning and tree-planting; reforestation
School-Visitors *(Curriculum-based)* * *Sensory; Empathy; Exploration; Action;* ***Experimenting***	The interpretative and educative sessions can be tailored to accommodate the school-visitor group(s) according to their curriculum-based demands and interests, present the	* All topics are appropriate, and may present a challenging level. Basic and some in-depth content is part of the learning process in and	* All the above, and experiments and other learning tools can be used, such as working sheets, etc. * Learn about different types of	* Build nature, biome, ecosystem models * Use comparisons tables * Flora and fauna list elaboration * Biological and ecological tests and observations

(continued)

Table 8.4 (continued)

Age range	Desirable topics and approaches	Not recommended topics	Interpreting topics across ages	
			Fauna (wild animals), flora, and ecosystems	Natural outdoor Settings / sites, zoos, sanctuaries (*Forests, Savannah, Deserts; Marine, River, Lake Environments, etc.*)
	challenge of finding the right questions to ask: this is so often neglected, and an important part of both creative and critical thinking	with a natural setting and wildlife	biomes/ecosystems and resources	* Nature-based play games * Nature discovery activities * Tree species learning and tree-planting; reforestation
Specific Interest Groups (Adults) *(College, University students; researchers; professional wildlife watchers; etc.)* * *Sensory; Empathy; Exploration; Action; Experimenting,* ***Testing, Finding, and Developing new understandings***	The interpretative, educative and sessions can be tailored to accommodate the groups according to their demands, interests and focus	* All topics are appropriate, and in-depth content is expected as part of the sessions	* All the above, and experiments, and other learning tools can be used * Learn about different types of biomes/ecosystems and resources	* Build nature, biome, ecosystem models * Use comparisons tables * Flora and fauna list elaboration * Biological and ecological tests and observations * Experiments * Scientifically focussed activities

Source The author. This table was built adapted from multiple sources, among them Veverka (1998, 2001, 2014), and based on the author's research and self-experience on the ground in Australia, Gold Coast, Cairns, and Darwin, in 2015, and particularly in New Zealand, between 2004 and 2008, following the environmental interpretation, education and conservation work of Kuaka New Zealand with visitors on the Bay of Plenty as part of his doctoral research

Fig. 8.4 David Fleay, "Platypusary" and school visitors on Gold Coast, Australia. *Source* Author own work. Picture taken from an informative outdoor sign at David Fleay Wildlife Park, Gold Coast, Australia, 2015 (*original *black* and *white photograph* from the David Fleay Natural history collection)

> For international visitors, it may be possible to create an Australian equivalent to Africa's 'Big Five' (e.g. 'You've seen Africa's Big Five, what about the Seven Wonders from Down Under'?, in Australia). Suitable species might be the koala, kangaroo (red or eastern grey), saltwater crocodile, platypus, bilby, and wombat. This could be mirrored on a regional/state scale, emphasising species of particular local interest (p. 39).

Currently, the David Fleay Wildlife Park continues Fleay's work by gathering different threatened native

animals in one location for public education and for breeding with ultimate release back into the wild. The platypus is an attraction of great appeal for the visitors with them crowding at the David Fleay's Nocturnal House during the feeding and educational sessions managed by the rangers.

At present days, the Park is managed by Queensland Parks and Wildlife Service, under the Australian Environmental Protection Agency and Department of National Parks, Sport and Racing (NPRSR) legislation and norms, and it aims to raise community awareness about the need to protect native animals, particularly endangered and threatened ones. Cassowaries, emus, platypuses, possums, crocodiles, greater bilby (Macrotis lagotis), and koalas are some of the animals in the Park. At the Park, visitors of all ages and adults have an opportunity to attend educational sessions with rangers several times a day; there is the session at the amphitheatre, another in an indoor theatre, plus crocodiles and platypus feeding, etc. Curriculum-based visitors have used David Fleay's as an outdoor learning complementary to their school subjects on biology and ecology, among other scientific disciplines and topics. During the sessions, rangers and school teachers work in association to explain in an enticing and educative way the major aspects of the wildlife and its habitats as well as related ecological phenomena (see Fig. 8.5).

Apart from the educational sessions and ranger's interpretative mediation, the visitors have also an opportunity for a self-guided learning through several signs on wild animals and ecosystems, and by observing and appreciating the wildlife in natural semi-captive settings (Fig. 8.4). At David Fleay Park, visitors are not allowed to touch, handle, cuddle, hold, or feed the animals. This is strictly prohibited at the Park whose major mission is wildlife conservation and breeding. Generally only the rangers manage and handle the animals, and visitors are passive in this process that assembles elements for an experiential learning, although they do sometimes allow visitors to touch, but not to hold or feed the animals.

8.6.2 Currumbin Wildlife Sanctuary: An Overview

The Sanctuary was established in 1947 by beekeeper and flower grower Alex Griffiths, who started feeding wild lorikeets of the region as the means to prevent them from causing damage to his blooms. "The feeding of the colourful lorikeets soon developed from a local curiosity to a popular tourist attraction […], and" in 1976, the sanctuary was donated to the National Trust of Queensland—a like-minded organisation dedicated to preserving the state's natural and cultural heritage. The Trust continues to operate the sanctuary on a not-for-profit basis, "with all revenue reinvested back into the park, in conservation-based research, caring for sick and injured wildlife and public education" (CWS Organisation, Alex Griffiths and our history, online). On 1st of July 2014, the National Trust of Queensland changed the Sanctuary's name to 'National Trust of Australia' (Queensland), and this way it became independent of government. It has hundreds of wild Australian animals on display, as well as in natural bush land and rainforest settings; it has been intensely visited by domestic and foreign visitors.

At Currumbin's, visitors can have direct physical contact with some species such as koalas, kangaroos, emus, wallabies, snakes, and birds during the flying shows. Kangaroos and lorikeets feeding is part of the visitors' experience (Fig. 8.6). Holding a koala or young crocodile for pictures and in other attractions is a paid possibility at the place, so the Sanctuary can also gain extra finance for maintaining the place. Currumbin Sanctuary has many entertaining and educational options for the visitors, including sessions with their own staff (rangers) and self-learning informative signs spread throughout the property (see Fig. 8.6). It defines itself as being a wildlife conservation and educational business, and as such has become competitive with David Fleay Wildlife Park,—located approximately eight kilometres (10 min drive) away.

The following statement was posted by Long (2015), sharing his opinion as a visitor at Currumbin Wildlife Sanctuary, and it summarises a visitor feeling of being part of an experiential learning and wild animal encounter in Australia,

> I've evolved over the years on the issue of zoos and aquariums and for the most part, I don't like them. I know the counter-arguments, that the research they conduct actually helps preserve species, but I can't help but feeling that it just doesn't seem right. Sanctuaries and refuges are different, usually, and it's their focus on aiding and protecting local wildlife that draws me to them time and time again, just as I was when I visited the Currumbin Wildlife Sanctuary along the Gold Coast of Australia. A heritage listed establishment, the Sanctuary has been helping animals and educating visitors for almost 70 years. Today it's home to a wide variety of native Australian animal species as well as a hospital where they take in thousands of sick or injured animals every year. Yes, animals are in enclosures and thousands of visitors crowd around them each year. But it's an establishment that has, since the very beginning, been all about protecting native wildlife and trying to find ways to integrate them into the human population explosion found around the state. It's also a way for people to learn more about them, because once we see and even touch an unfamiliar animal, we can't help but feel responsible for it. The Sanctuary has a lot of educational programming options for all ages and a personal favourite experience was to hang out with kangaroos for the afternoon, feeding and even petting them as they slept under leafy trees. (Matt Long, Destinations Landlopers blog, July 2015, online).

Orams (2002, p. 289), based on the available literature, explained some aspects of wildlife's and visitors' management at the Sanctuary,

Fig. 8.5 School visitors at the David Fleay Wildlife Park: experiential learning on wildlife and conservation through environmental interpretation and education and signs. *Source* Author's own work and pictures collection, Gold Coast, Australia, 2015

…[Currumbin] has been feeding wild Rainbow Lorikeets (a small parrot) since the 1940s. These feeding sessions are closely controlled by trained staff. The food provided is a mixture developed to prevent dietary deficiency (Cannon 1979) and food receptacles are disinfected prior to and after use. In addition, an interpretation programme is delivered to tourists during the feeding sessions. Staff at the sanctuary also monitor the numbers and health of the birds as well as support research (Burger 1997).

Fig. 8.6 Interactive and educational opportunities for visitors: Kangaroo feeding and ecological signs. *Source* Author own collection of pictures, field work on Gold Coast, in 2015

8.7 Australian Wildlife, Interpretation and Education: Ecological and Biological Elements

Wildlife interpretation and, consequently environmental education on wildlife, particularly through interpretative tourism, functions to propitiate distinct levels of connections between visitors and the world of science. Through the art of interpretation, which involves communicative strategies and tools, the natural world, landscapes and aesthetic aspects are presented to people. According to Ward and Wilkinson (2006), some of the most used presentation strategies are: characterisation, demonstration, storytelling, puppets, guided imagery and guest speaker. All these strategies can be combined with interactive nature-visitor play activities, for example, sensory ones such textures, colours, shapes, smell, nature stuff collection, etc. One of the strengths of environmental interpretation and education in Tourism is the

potentiality of a segmented learning with a focus on ecological and biological aspects of species, and on their habitats, animal behaviour, but with less stress on in-depth scientific data and more attention on observation and interrelationships among and between visitors, ecosystems and species with the assimilation of it into human affairs. Wildlife interpretation enriches individual and group experiences in a site or destination by revealing meanings about the natural, historical and recreational resources mostly in an interdisciplinary and holistic way.

Apart from the biological characteristics of wild species, of habitats and of aesthetic components, other elements are nuclei to interpretation in wildlife tourism, such as wild species conservation and management, pest control, control of human disturbances (Green and Higginbottom 2001; Higginbottom 2004), carrying capacity, as well as ecological restoration, reforestation, re-wilding to improve habitats, issues of hydric resources and of soil components and erosion, etc. With regards to environmental science (Nebel and Wright 1993; Odum 2006; Asthana and Asthanba 2006), the following disciplines and issues have been object of basic presentation and interpretation to visitors, such as natural history of species; flora ecology; aquatic ecology; fisheries; oceanography which includes marine life and ecology; avian ecology; insect biology; cycles and influences of weather and climate; and geology. Wildlife tourism, as a sub-set of nature-based tourism, is defined by Higginbottom (2004), as a type of "tourism based on encounters with non-domesticated (non-human) animals… [that] can occur in either the animals' natural environment or in captivity" (p. 2). Newsome et al. (2005) define wildlife tourism as a type of tourism based on the observations of wildlife and human-wild animal interactions, it is a form of tourism "undertaken to view and/or encounter wildlife. It can take place in a range of settings, from captive, semi-captive, to in the wild, and it encompasses a variety of interactions from passive observation to feeding and/or touching the species viewed" (Preface, ix), but some studies draw attention to negative impacts caused by human-wildlife interactions (Hughes and Carlsen 2008), and Green and Higginbottom (2001) explored potential impacts on wildlife in Australia.

In a guided tour, the delivery of such content is purposeful to an individual or group interest which can be either superficial with very basic messages and data or it can be much more in-depth and scientific grounded, for example, if the group of visitors is curriculum-based seeking outdoors complementary knowledge for their disciplines. The targeted audience matters significantly at the moment of tailoring and delivering ecological and biological information on wildlife. Age, background, country of origin, command of English with satisfactory listening skills, individual or group purposes are some factors that should be taken into account at the moment to meaningfully present and mediate the 'natural world' to 'visitors'.

8.8 Kolb's Experiential Learning Theory, and Interpretative and Educational Wildlife Tourism

Kolb's Experiential Learning Theory (ELT) considers an ideal learning spiral based on the dialectics of conceptualising and experiencing, and of acting and reflecting as responsive outcomes of a learning situation. Kolb (1984) perceives learning as 'the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience' (p. 41). His proposed learning model is dialectically related to four experiential modes: *Concrete Experience* (CE); *Reflective Observation* (RO), *Abstract Conceptualisation* (AC), and *Active Experimentation* (AE). It is a cyclical process through which concrete experiences lead to reflective observations, which is followed by an 'abstract conceptualisation'—a stage in which new concepts are thus created. These three former stages enable the development of implications for actions called as 'active experimentation', which, by its turn, leads to a 'concrete experience'. As Packer and Ballantyne (2013) put it in simpler terms, "this is a cycle of experiencing, reflecting, thinking and acting" (p. 170).

Kolb's experiential learning proposal can be fully applied to explain a learning process which involves visitors-nature-guides/ranchers as mediators with environmental interpretation and education in wildlife tourism being the means and tools for achieving it. Figure 8.7 shows the whole learning process by presenting the biotic, abiotic elements and factors, and associated phenomena, interlinked to ecological and biological scientific approaches, which serve as a foundation for guides and ranchers, to holistically mediate the ecosystems with its specific fauna and flora to visitors. The role of guides and rangers as mediators can be active by bridging 'visitors' to nature by using a series of strategies and techniques, such as demonstration, characterisation, which are mostly guide-centred, that is, the guides play a major role as protagonists for presenting an ecosystem to visitors. Conversely, nature interactive activities, such as sensory and nature modelling ones, are mostly visitor-centred, and the visitors themselves become the main protagonists in their contact with nature, occasionally under the guidance or supervision of a person (guide, rancher, tutor, instructor, fellow, colleague, teacher, etc.) on duty for it. Passive mediation in environmental interpretation and education refers to those tools and environments in which guides and rangers have a minor role in presenting nature themselves due to the use of technological and audiovisual

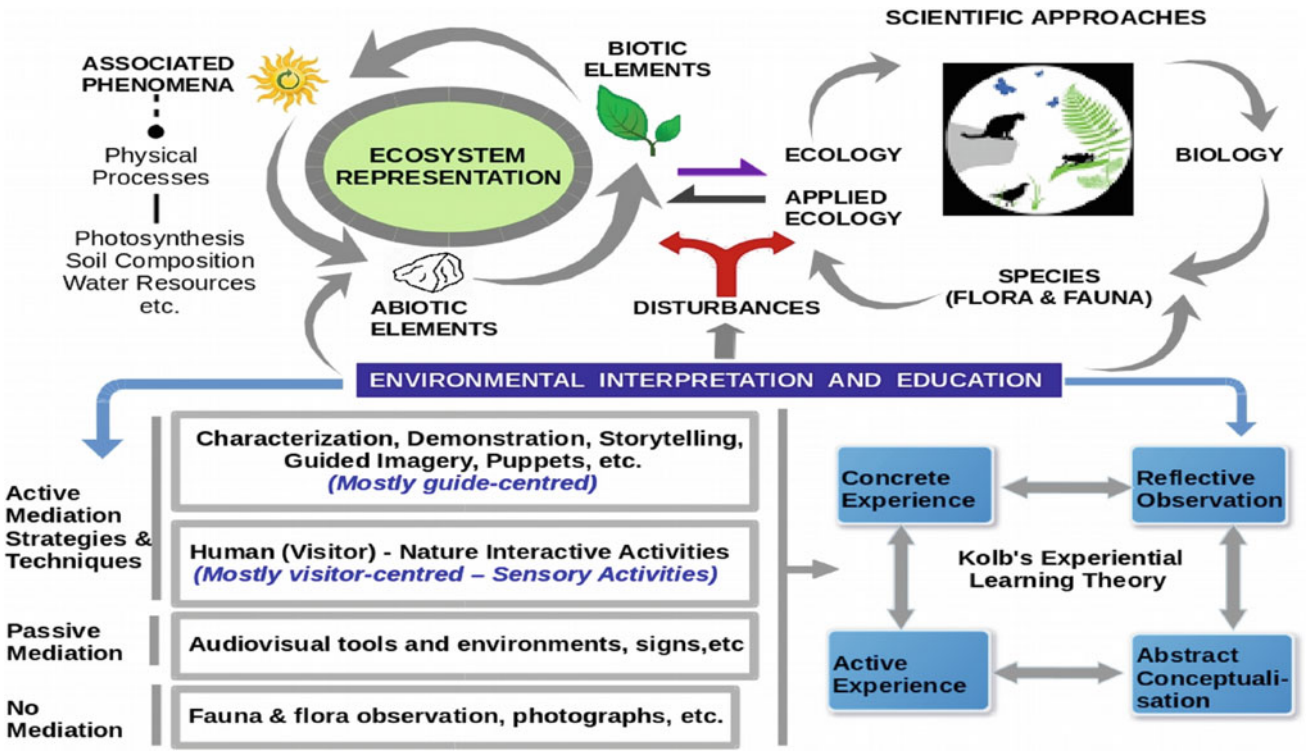


Fig. 8.7 Conceptual diagram for all biotic and abiotic elements, and ecosystem associated phenomena to be part of a holistic environmental interpretation and education for visitors' experiential learning. *Source* The author

instruments, such as video, documentary, slideshow, mobile applications, signs, etc.

The techniques, activities and audiovisual equipments for environmental interpretation and education can be developed to propitiate edu-recreational, conservationist, discovery, educational curriculum-based experiences, etc. On the other hand, ecological and biological learning and experiences can be a self-achievement without any mediation of guides and rangers. For example, visitors can choose to discover, contemplate, experience and learn about an ecosystem by watching, viewing, photographing the fauna and flora, by observing, recording, and exploring the abiotic elements and the physical processes (or the results of them). The point is that ecological and biological factors are inherently part of the process of being in contact with nature. For all them, experiential learning is a multileveled factor in environmental interpretation and education either being a mediated or self-conducted learning. It involves at some point 'Concrete Experience' (CE), 'Reflective Observation' (RO), Abstract Conceptualisation (AC), and Active Experience (AE) in a spiral learning cycle. For example, nature contemplation can be 'reflective observation', thus, 'concrete experience', and it leads to 'abstract concepts' on nature, and this process can result in an 'active experience'. This cycle (CE, RO, AC, and AE) can be even more noticeable as mediation plays a critical role in promoting experiential learning, lets say, in wildlife demonstration and characterisation (Fig. 8.7). In terms of sustainability, an experiential learning in tourism, mediated by a guide or ranger, can for example contribute to enhance visitors' understanding of a site and of environments and foster visitors' post-visit, pro-nature conservation decisions and behaviours (Weiler and Black 2015). As noted, the analysis is mostly conceptual for illustrating the case; this Chapter does not aim to present and crisscross all the variables, situation, content, and elements to outline a visitor-nature-guide/rancher learning experience in light of Kolb's theory. This is an aspect to be investigated in a future research.

In Fig. 8.7, the 'ecosystem', and its components and factors, are taken as the main '*arena*' and 'focus' for an environmental interpretation and education in wildlife tourism; it is represented by biotic and abiotic elements, and associated phenomena. The ecosystem is "composed of a biological community and its physical environment. The environment includes abiotic factors (nonliving components) …as well as biotic factors" (Cunningham et al. 2005, p. 57).

In the field of biology and ecology, abiotic elements are widely understood as all non-living things and resources and physical conditions that can affect living organisms, for example, degradation of a substance by hydrolysis, and abiotic factors can include water resources, and their state and conditions, light, temperature, atmosphere, and soil and

its components, such as rock, sand, minerals, etc. The waves can also be regarded as an abiotic factor in a marine context (Sadava et al. 2014; Chapin et al. 2011; Hogan 2010). In this chapter, the non-living things—individual object or groups of objects—are classified as abiotic components. The physical, chemical and geochemical processes are called named 'associated phenomena', which include the effects of temperature, rain, radiation on an ecosystem, flood-related erosions, micro-climate; that is, abiotic phenomena or processes (Cunningham et al. 2005). The biotic elements or factors are related to all living beings, and in a very simplistic explanation: the green plants are classified as '*producers*' because of the photosynthesis they do; the domestic and wild animals as '*consumers*'; the microorganisms as '*decomposers*' (Zahran 2010; Krebs 2007; Cunningham et al. 2005; Nebel and Wright 1993). Photosynthesis involves biotic and abiotic components in a process whereby sunlight (abiotic) is captured by green plants, algae and some bacteria with synthesis of sugars and proteins in tiny membranous organelles called chloroplasts that reside within plant cells (so, it is also biotic) (Cunningham et al. 2005, pp. 55–56).

8.9 Natural and Anthropogenic Disturbances on Wildlife

Disturbances are caused by all natural and non-natural factors that have an impact on nature, on the ecosystems, which directly or indirectly affect the biotic and abiotic elements, and any associated phenomena, and Walker (2012) also classifies 'disturbance' as allogenic and autogenic; and, disturbance by addition; its main characteristics can be typified by frequency, intensity, severity, extent, and interactions. Impact is understood as any endogenous and exogenous interference or intervention on a natural order and, or, state of the Earth to an extent that changes it positive or negatively (Elmqvist et al. 2003). Natural disturbances (extreme disturbances) can be caused by physical, geophysical, and, or chemical interferences on the natural state of the world such as earthquakes, volcanoes, floods (Zahran 2010; Prestemon et al. 2008), erosion, tsunamis, landslides, etc. Prestemon et al. (2008) define it as a "process that results in significant changes in ecosystem structure, leading to alterations in function and the goods and services that humans derive from nature", for example, natural disturbances in forested areas can take place "by physical and biological processes. Large, landscape scale disturbances derive primarily from weather (droughts, winds, ice storms, and floods), geophysical activities (…volcanic eruptions, even asteroid strikes), fires, insects, and diseases" (pp. 35–36).

The impacts of natural disasters (extreme disturbances) on tourism and on the wildlife have been the focus of a lot of research, articles, and books to better understand their immediate and long term effects. More often, the theme draws attention to a disaster context, damaged environment, and biodiversity loss, and to help the local tourism industry and related communities to rebuild themselves and to restore the lost natural assets and resources, as well as to develop management plans for reduction of natural disaster impacts (WTO 1998; White and Frew 2015; Richardson et al. 2015). As one destination is affected by a cyclone, hurricane, volcano, quake—a natural disaster—, this is not only an issue related to a site that needs to be rebuilt and to strategies that need to be put into practice to re-establish the place and business of tourism industry, but also has possible severe and lasting effects on the local ecosystems. The extension of damage is above all irreparable if one looks at the loss of local and regional biodiversity; the loss of wild life can be huge in a calamitous natural event (WTO 1998; White and Frew 2015; Richardson et al. 2015). Holden (2016) reinforces that natural disasters have economic and social impacts, affecting the tourism sector of some destinations. For example, on 26 December 2004, the Boxing Day *tsunami,* killed more than 230,000 people across 14 countries in Asia, such as India, Indonesia, Thailand, and Sri Lanka (UNESCO 2006; Buultjens et al. 2015). Holden (2016) explains that "the geographical location of many of the popular environments for tourism, notably coastal areas, small islands and mountains, make them especially vulnerable to extreme weather events and natural disasters; he also mentions the devastating effects of Hurricane Katrina in 2005 by flooding New Orleans in the USA" (p. 241). But lightning strikes are also a potential risk as they can ignite fires on a wildland and destroy the biodiversity, particularly in the rainforests (Mackey et al. 2002), but rainforests don't so often burn as fires usually travel much further and more fiercely through other habitats. Frequent fires have effects on the ecosystem with loss of wildlife habitat, reduction of biodiversity, invasions by non-native species; it can alter the watershed functioning, as well as other fire-associated hazards, including the loss of tourist appeal (Brooks 2008, p. 45) and can threaten fauna and flora populations resulting in habitat loss (Turton 2014), affecting tourism in these areas.

Conversely, non-natural disturbances are anthropogenic-related, caused by humans, mostly in reason of man's overuses of the natural resources; they are human-induced environmental changes that differ from most natural changes, often happen at a faster rate than the natural disturbances which make the living environment to all species an unpleasant and unsustainable place (Candolin 2009). As Walker and Willig (1999) posit it, "Human interferences with natural disturbances (e.g. fire suppression) may actually make them more destructive […]. Some anthropogenic disturbances are well publicised […] such as

urbanization, excavation of minerals, soil erosion as a result of agriculture, or logging of forests, may have far greater consequences" (p. 1). Within the mid-shades of tourism impacts, it counts negatively the undesirable corollaries caused by cumulative effects and permanent degradation in a way it compromises tourism sites, particularly, those reliant on natural assets including the wildlife (Green and Higginbottom 2001; Higginbottom 2004) due to facilities and infrastructures, destruction of habitats, aesthetics impacts, and neglected contact with wildlife and unsustainable consumption of fauna and flora which includes plants picking, souvenirs made from wildlife, fishing, and shooting (Intosai 2013; Sunlu 2003), and unregulated recreational hunting (Bauer and Giles 2002; Knight and Cole 1991). Figure 8.8 shows the main natural and anthropogenic disturbances, as well as some effects of disturbances, including ones caused on wildlife by visitors in nature-based tourism activities. Some of the ecological remedial responses (Hughes and Carlsen 2008) to human-induced disturbances on wildlife include conservation, protection, ecological restoration, pests control, zoning and carrying capacity. The last two are widely in tourism as a way to mitigate negative impacts.

Both natural and anthropogenic-related disturbances and the way to overcome them can be issues to be addressed in environmental interpretation and education as these factors draw attention to the relevance of conservation and of ecological restoration of impacted wildlands and wildlife. Interpretation as a process of communicating facts of the natural world, and as Interpretation Canada poses it, "interpretation can play an important role in natural resource management and conservation as well as meeting the goals of sustainable tourism" (1976, cited in Carter et al. 2015, p. 296). On the other hand, unsustainable tourism practices can become sources for impacts on wildlife and on ecosystems. For example, in the literature there is a plethora of publications with criticism on visitors' closeness, touch, holding, and on artificial feeding of wildlife

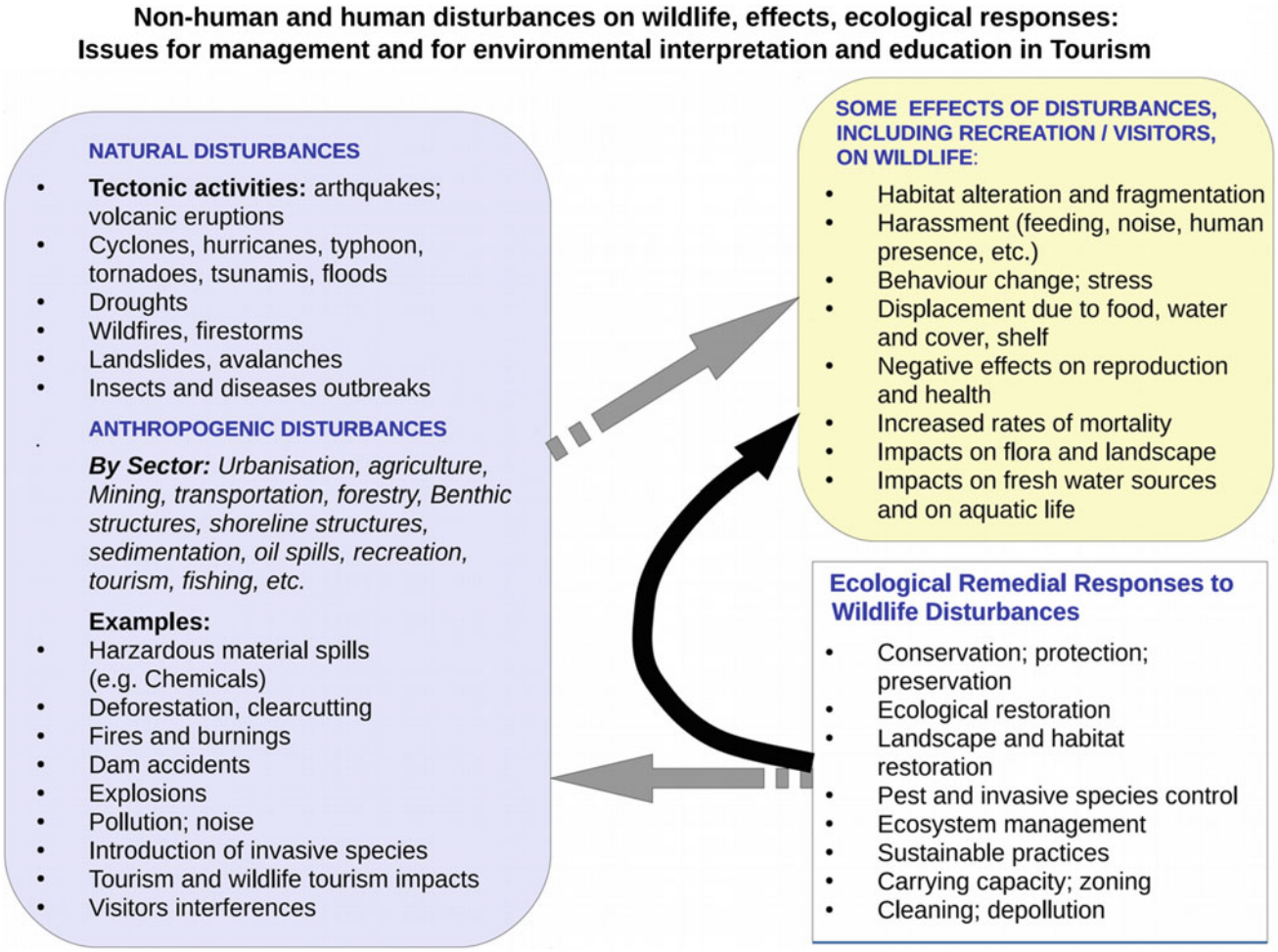


Fig. 8.8 Non-human and human disturbances on wildlife, effects, ecological responses: issues for management and environmental interpretation and education in tourism. *Source* The author, based on multiple sources

(Orams 2000; Newsome et al. 2005; CRC 2009; Fennell 2015; Burns 2015). Orams (2002) found that,

> Deliberate and long-term provision of food to wildlife has been shown to alter natural behaviour patterns and population levels. It has also resulted in the dependency of animals on the human provided food and their habituation to human contact. Intra and inter-species aggression has also occurred where wildlife, in their efforts to obtain food, have harmed one another and harmed tourists (p. 281, abstract).

Wild animals in the wild react differently to human presence, and a series of factors may influence the contact with humans; it depends on the sensitivity of the animal itself, the animal's past experience and characteristics of the habitat in which it occurs, as well as the "frequency, magnitude, timing and location of the disturbance" (Newsome et al. 2002, p. 182), and this topic is thoroughly examined in this Volume by Ronda Green, Chap. 14, entitled 'Disturbing Skippy on Tour: does it really matter? Ecological and ethical implications of disturbing wildlife'. However, wild animals in semi-captivity settings in some wildlife sanctuaries and ecolodges are fed by visitors as observed at Currumbin Wildlife Sanctuary on Gold Coast with kangaroos (see Fig. 8.5) and lorikeets, but as highlighted by Newsome et al. (2005), "there may also be highly structured feeding situations that are directly controlled by management. This may involve the development of a special area or feeding station where controlled amounts of appropriate foods are dispensed to the public for feeding animals at specific times" (p. 76). The three key responses a wild animal may have in reason of deliberate feeding by visitors are 'avoidance', 'attraction', and 'habituation' (Whittaker and Knight 1998), and reactions are regarded as behavioural changes that many animals use as a way to survive in the wild (Newsome et al. 2005). Figure 8.9 presents details of these three responses and the mitigatory actions to manage wildlife feeding as rules for visitors as visiting the wild.

8.10 Harnessing Wildlife, Ecosystems, Conservation and Experiential Learning: A Holistic Approach for Visitors' Environmental Interpretation and Education

In this sphere of wildlife and ecosystems presentation, conservation and experiential learning, ecology, applied ecology and biology as scientific subjects can largely be used by guides and rangers to educate visitors and also to explain the importance, characteristics, services, and particularities of an ecosystem, flora and fauna. These subjects and approaches are also pivotal in environmental interpretation and education to address and present ways of managing human disturbances to

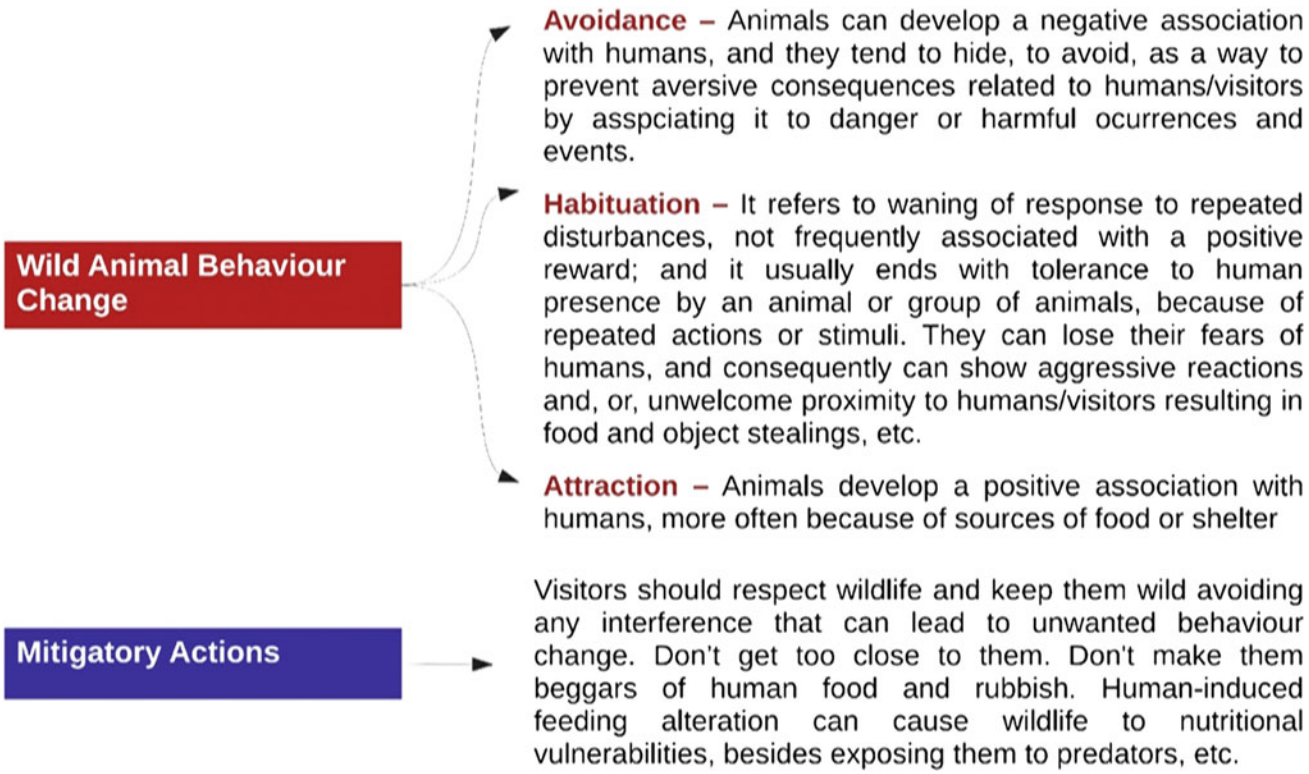


Fig. 8.9 Tourism and human-related interferences and wild animal behaviour change: avoidance, habituation and attraction. *Source* The author, based on multiple publications, e.g., Whittaker and Knight (1998), Newsome et al. (2005)

wildlife either reducing/eliminating impact risks or helping nature to restore its state. Ecology is a term that derives from the Greek work '*Oikos*', which means 'house' or 'place to live', 'household'; and literally, ecology is the study of organisms 'at home', at their environment (Smith 1996; Odum 2006). Ecology is defined by Margalef (1968) as, "the study of systems at the level in which individuals or whole organisms can be considered as elements of interaction, either among themselves, or with a loosely organised environmental matrix. Systems at this level are called ecosystems, and ecology is the biology of ecosystems" (pp. 51–53), and (Cunningham et al. 2005) adds as a definition that 'ecology' is "concerned with the life histories, distribution, and behaviour of individual species as well as the structure and function of natural systems at the level of populations, communities, and ecosystems" (p. 569). Also relevant in this context it is 'applied ecology' as a subset of 'ecology', and is widely used by guides and rangers to address issues related to world of life, the ecosystems and their dwellers, to visitors so they can better understand the natural spaces, interactions, and networks to which the wild species belong to (Cunningham et al. 2005; Odum 2006; Hastings and Gross 2012). The Journal of Applied Ecology, for example, publishes research and academic studies concerning applied ecological problems which include all major themes in this field, such as conservation biology, global change, environmental pollution, wildlife and habitat management, land use and management, aquatic resources, restoration ecology, and the management of pests, weeds and disease. The scale of ecosystems degradation has been considerably in the last decades, and it has affected the ability of nature to deliver main services, such as purification of water cycles, climate regulation, photosynthesis and clean air, waste decomposition, etc. (Balvanera et al. 2001; Elmqvist et al. 2003; Hastings and Gross 2012).

The environmental services are provided by a diversity of organisms within an ecosystem and a holistic guiding is dedicated to mediate an array of visitors experiences in the natural world to an extent it contributes to an understanding and learning about the relevance of the ecosystem services, and sustainability as an equilibrium continuum demanded for human/nature relations and the wonders of wildlife (Balvanera et al. 2001; Odum 2006; Cunningham et al. 2005). Mitigation, reduction and, or, elimination of impacts on the ecosystem and its wildlife can be achieved through conservation, protection, ecological restoration; landscape and habitat restoration; pest and invasive species control; ecosystem management; depolluting, and managing for carrying capacity and zoning for different uses or levels of use (van Driesche et al. 2016; Hastings and Gross 2012; Cunningham et al. 2005; Balvanera et al. 2001). The last two are more noticeable and used for sustainable practices in wildlife tourism. In fact, "wildlife tourism offers unique opportunities for participants to reconnect with nature in a potentially life-changing way and has become increasingly popular in recent years (Ballantyne et al. 2011, p. 2). Reynolds and Braithwaite (2001) identified some categories of wildlife tourism products which can enable a learning experience: nature-based tourism with a wildlife component; locations with good wildlife opportunities; artificial attractions based on wildlife; specialist animal watching; habitat specific tours; thrill-offering tours, e.g., safaris for wildlife viewing. In this sense, environmental interpretation and education is fundamental to help visitors to understand the processes and, more importantly, the sustainable practices necessary for a balance in nature, and even tourism activities should be of attention and inclusion in regards to this aspect, "wildlife watching can only be sustainable if it contributes to the conservation and survival of the watched species and their habitats…to attain long-term sustainability of wildlife watching includes interaction, long-term survival of population and habitats…put in place for sustainably managing wildlife watching tourism, conservation." (Intosai 2013, p. 17). As Ballantyne et al. (2011) posit it, the goals of wildlife tourism should be "to educate visitors about the threats facing wildlife in general, and the actions needed to protect the environment and maintain biodiversity" (p. 770), and their view corroborate the key argument of this chapter that, "the educational aspects of wildlife tourism experiences not only impact on visitor learning and subsequent behaviour, but are also an important contributor to visitor satisfaction with the experience" (p. 772). It is worth noting that interpretation should not be entirely about the problems; it is important to also interpret in such a way as to elicit a fascination with and empathy for the animals so that the messages about the problems mean more to the audience.

8.11 Australian Wildlife as Tourism Attractions and Showcase for Visitors' Environmental Learning

It seems that of all the continents and countries, Australia has the most unusual assortment of animals and plants. Almost half of the world's 314 kinds of marsupials (pouched mammals) are found only in Australia, and most of the others are in neighbouring islands such as New Guinea and the extreme eastern parts of Indonesia, only about 70 kinds occurring in the Americas. Marsupials include kangaroos, koalas, possums, gliders, and bandicoots. The monotremes —platypus and echidna, the only mammals that lay eggs— also live in Australia; the platypus being found nowhere else, but echidnas also inhabiting New Guinea. It is now accepted that the ancestors of the passerines (songbirds) arose in the Australian section of Gondwana, and the most Australian songbirds, despite misleading common names belong to families not found in other continents (Low 2014).

The Australian landscape is very varied. Some of the wetter areas in the south also harbour temperate forests, and there are regions of mountain or coastal heaths, including alpine areas that are often snow-covered in winter (Green 2014). However, Australia is the driest continent on the planet, and the rainfall is the most unpredictable in the world: many lakes and watercourses in the outback (the vast, dry interior of Australia) can remain dry for years and suddenly fill again, attracting many thousands of waterbirds, so it cannot be said it is all dry and desolate (Green 2014). "Australia has many different habitats, from rugged coastlines and sandy beaches to snow-capped mountains, tropical rainforests, huge wetlands, winding rivers and wide open grasslands". The outback is the vast dry interior of Australia, but with significant portion of it covered by hummock or tussock grasses, and in more southern parts by chenopod shrubs (plants of the family *Chenopodiaceae*) or low acacia woodland; moreover, some plants have deep roots that can find water meters down underground (Parish 2006, p. 8).

Australian biodiversity has been acknowledged as very rich, diversified, and a high proportion is endemic to Australia, conveying a great appeal on visitors and have become catchy tourism attractions in zoos, sanctuaries, and parks in the country. The key mammals usually sought-after by visitors are the echidnas, a monotreme; kangaroos; wallabies; koalas; greater bilbies (the bilby); Tasmanian devils; platypuses; dingoes; wombat; flying-foxes (large fruit- and nectar-eating bats) (Egerton and Lochman 2009; Green et al. 2001; Green 2014). The animals of the outback adapt themselves to the harsh conditions of the region, and the majority are endemic species, that is, found only in Australia, which, by the way, it includes the birds, lizards, snakes and frogs of the outback as well a habitat is a place where an animal makes its home. The plants of the outback can provide a colourful contrast to the rusty brown or yellow soil, such as sturt pea with its scarlet and black flowers, or bluebush and saltbush with their pale blue-green or silvery foliage (an adaptation to reflect the heat of the sun) (Green et al. 2001; Green 2014). For an animal to be found naturally in a habitat, it obviously must be able to survive there. It must be able to find enough food, water, oxygen and shelter to help it live, grow and produce young. Some animals can only survive in one type of habitat, while others can live in many different ones across Australia. Australia has a varied landscape, it is formed by rocky cliffs, deserts, coasts, rainforests, woodlands, heathlands, salt and freshwater lakes, rivers and streams (Green et al. 2001; Green 2014; Egerton and Lochman 2009).

Figure 8.10 shows eight ecoregions of Australia with its states and territories, and the landscapes vary from deserts and xeric shrublands, savannah, to temperate, Mediterranean, tropical and subtropical forests. Figure 8.10 also presents the twelve major iconic Australian species with relevant tourism interest and appeal. Most of them are endemic species with significant tourism interest and appeal, and are object of ecological and biological interpretation and education. Table 8.5 has complementary information on the species presented in Fig. 8.10. It brings the popular and scientific names of the species, their conservation e vulnerability status; their geographic location by state and territory, as well as the ecoregion to which they belong to. Of the twelve taxa mentioned in Table 8.5, two are classified as threatened by the IUCN Red List. The focussed species are 'mammals', except for the saltwater crocodile (reptiles) and the cassowary, one of the world's largest flightless birds.

The list just brings some of the most iconic and appealing wild animals, most of them endemic species; the list does not include sharks, whales, dolphins, and other marine species, and it also does not cite the great variety of birds of Australia that attract considerable numbers of visitors every year for bird watching, and some of them are professional 'birders'. A birder is defined as a bird watcher; people who identify and study birds in their natural habitats; it also refers to breeders of birds. In the literature, there are books and manuals specialised, including the CRC Report on bird-watching (Jones and Buckley 2001), at addressing issues related to bird watching and viewing in Australia. In 2015, Leseberg and Campbell published a book on 'top end' [main] birds and animals of Australia that can found and observed in Darwin, Kakadu, Katherine, and Kununurra regions. Australian birds have been extensively discussed in an array of niche publications covering hundreds of species that reside and migrant ones found in the country; the books, manuals guides, etc. usually have detailed birds' key features, distribution, classification of sounds, and behaviour, besides to provide comprehensive habitat explanations (Low 2014; Campbell et al. 2014; Thomas et al. 2011; Clarke and Dolby 2014).

Table 8.5 shows some wild species that usually have tourism appeal in Australia (Fredline 2007; Green et al. 2001) among them kangaroos (red, eastern grey and western grey kangaroo), echidna, flying fox, cassowary, Tasmanian devil, dingo, platypus, wallabies (there are about 30 species of this species), wombat, koala, greater bilby, and crocodile, but the list is not exhaustive as other small and large wild animals also draw attention from visitors. Most of them are endemic, only found in Australian lands. Table 8.5 provides a concise outline of twelve taxa with its scientific names, conservation status (vulnerability), geographic location, and ecoregion where they are usually found. Except for the cassowary and the crocodile, all others are mammals. For a very comprehensive tourism classification of Australian wildlife, the report produced by Green et al. (2001) presents the relevant information and data on major categories of Australian wildlife (terrestrial mammals, birds, reptiles, amphibians, terrestrial invertebrates, freshwater fauna and

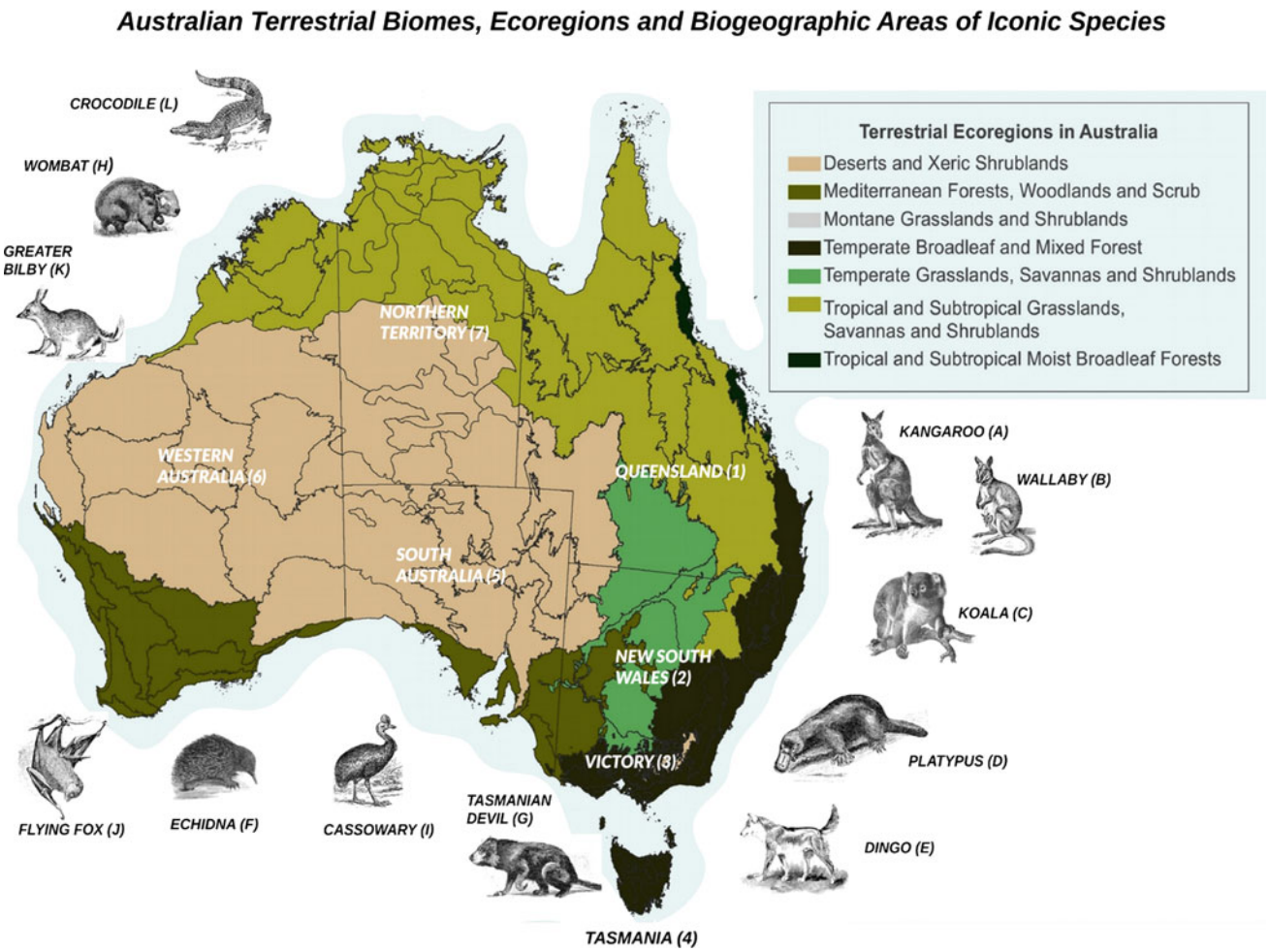


Fig. 8.10 Australian map with its eight ecoregions and the major wild vertebrates. *Source* The author, based on multiple sources. The original map was produced by ERIN (Environmental Resources Information Network), April 2012. Australian Government Department of Sustainability, Environment, Water, Population and Communities. © Commonwealth of Australia, 2012. Available under a Creative Commons Attribution 3.0

marine fauna); the report highlights the kinds of opportunities and constraints on wildlife tourism development within each of these category, as well as the findings can serve to encourage sustainable practices and appropriate development for the wildlife tourism niche in Australia.

8.12 Koalas, Red Kangaroos, and Tasmanian Devils: An Ecological and Biological Detailed Outline of Three Iconic Wild Animals of Australia

This section aims to provide an ecological and biological overview of three iconic species of Australia that are very popular among the visitors, particularly foreign ones. These three species were selected for a detailed outline by reason of their very peculiar characteristics and for being iconic and endemic for Australia. This outline is presented as part of a previous analysis that seeks to show the main characteristics and aspects of them that are pertinent for an environmental interpretation and education within the experiential learning perspective of Kolb. After this extended outline, an analytical diagram will be produced as part of the final considerations for this chapter.

Some iconic native wild animals of Australia such as kangaroos, koalas, platypuses and Tasmanian devils have been for decades a tourism attraction for foreign and domestic visitors alike. The uniquenesses of these wild animals combined with an opportunity of a closer encounter, and even to touch or feed them in some privately or trusted-owned sanctuaries where they live in semi-captivity in Australia are such an experience that has a great appeal; Kangaroos, for example, play a key role for building an Australian tourism marketing imagery (Higginbottom and Northrope 2004), "kangaroos, koalas and crocodiles are the kinds of animals that feature most

Table 8.5 Twelve Australian wild animals with tourism appeal, their biofacts and habitats

Australian species with tourism appeal, and their scientific name	Conservation status/vulnerability	Geographic location (State/Territory) **Refer to* Fig. 8.10 *to check the related area*	Ecoregion/Biome **Refer to* Fig. 8.10 *to check the region*
Kangaroos (A)—Endemic **Red Kangaroo** *Macropus* (*osphranter) rufus* **Western Grey Kangaroo** *Macropus fuliginosus* **Eastern Grey Kangaroo** *Macropus giganteus*	Least concern, Pop: stable Least concern, Pop: increasing Least concern, Pop: stable	The red kangaroo is only in outback, and not near any of our capitals. The eastern and western greys are in more regions, and seen by many more tourists	Xeric scrubland, grassland, heathlands, and deserts
Red Necked Wallaby or Bennett's Wallaby (B) (*Macropus rufogriseus*) **Whiptail Wallaby (B)** *Macropus parryi* **Agile Wallaby (B)** *Macropus agilis*	Least concern, Pop: stable Least concern, Pop: stable Least concern, Pop: decreasing	1, 2, 3, 4	– Coastal scrub and sclerophyll forest along coastal and highland areas – Temperate broadleaf, mixed forests
Koala ***Endemic*** (*Phascolarctos cinereus).* ***Ps.***: *it is not a bear; it is* an arboreal herbivorous marsupial	Vulnerable	Coastal areas of the mainland's eastern and southern and central areas: 1, 2, 3, and 5	Eucalyptus forests and woodlands
Platypus (D) ***Endemic*** *(Ornithorhynchus anatinus)*	Near threatened, Pop: decreasing	1,2, 3, and 4	Watercourses in temperate broadleaf, mixed, and tropical forests
Dingo (E) *(Canis lupus dingo)* *Dingo, also known as warrigal, is* ***not endemic*** *to Australia* (Corbett 2008a)	Vulnerable	Throughout Australia, except Tasmania	Dingo's habitat includes alpine, woodland, grassland, desert and coastal areas
Short-beaked Echidna (F) (*Tachyglossus aculeatus*)	Least concern, Pop: stable	Throughout Australia (this and other species in New Guinea)	All ecoregions and habitats
Tasmanian Devil (G) ***Endemic*** (*Sarcophilus harrisii*)	**Endangered**, Pop: decreasing	Tasmania	Temperate broadleaf and mixed forests. Usually, it is found in dry sclerophyll forests and coastal woodlands
Wombat (H) ***Endemic*** **Common wombat** (Vombatus ursinus) **Northern hairy-nosed wombat or yaminon** *(Lasiorhinus krefftii)* **Southern hairy-nosed wombat** *(Lasiorhinus latifrons)*	Least concern, Pop: stable **Critically endangered**, Pop: stable Least concern, Pop: stable	South-eastern areas, including Tasmania, and an isolated patch of about 300 ha in Central Queensland (Epping Forest National Park): 1, 2, 3, 4, and 5 Ps.: The southern hairy-nosed only found in western WA to western NSW, and they are considered endangered in NSW. Common western Tasmania, southern SA, VIC and NSW, with a tiny population in southern Queensland	Forested, mountainous, and heathland areas. Temperate broadleaf and mixed forests (for common wombat) But, hairy nosed wombats require semi-arid inland regions, which include grassland, open plains, shrubland, savanna and open woodland
Southern Cassowary (I) (*Casuarius casuarius*)	Vulnerable. Pop: decreasing	Northern Queensland: 1	Tropical forests
Grey-Headed Flying Fox (J) ***Endemic*** *(Pteropus poliocephalus)*	Vulnerable. Pop: decreasing	1,2, and 3, but it may be found in different regions; e.g. South Australia	A variety of habitats: woodlands, rainforests and swamps. Temperate broadleaf and mixed forests
Greater Bilby (K) ***Endemic*** (*Macrotis lagotis*) **Long-nosed Bandicoot (K)**	Vulnerable. But, endangered in Queensland, Pop: decreasing	1, 6, 7	Arid, semi-arid **Bandicoot is in forests, woodlands and grasslands*

(continued)

Table 8.5 (continued)

Australian species with tourism appeal, and their scientific name	Conservation status/vulnerability	Geographic location (State/Territory) **Refer to* Fig. 8.10 *to check the related area*	Ecoregion/Biome **Refer to* Fig. 8.10 *to check the region*
Endemic *(Perameles nasuta)*	Least concern, Pop: unknown		
Saltwater Crocodile (L) *Also known as "saltie'* (*Crocodylusporosus*) **Ps.: Crocodiles are found not only in Australia as they populate many other regions of the planet*	Lower risk Least concern	Northernmost parts of the Northern Territory, including the multiple river systems near Darwin; Western Australia; and Queensland. 1, 6, 7	Tropical and subtropical savannah, grasslands and shrublands

For a full understanding of this table, it needs to be viewed in association with Fig. 8.10

Categories of the vulnerability and conservation status of species: extinct (EX); extinct in the wild (EW); critically endangered (CR); endangered (EN); vulnerable to extinction (VU); near threatened; least concern (LC); ***Ps.: Threatened***: *critically endangered (CR) and endangered (EN)*

Ps.: This Table must be used for basic reference only. There are studies that may reveal different figures in regards to wild animals' vulnerability, conservation, geographic locations, and ecoregions Woinarski and Burbidge (2016)

Source The author, and his table was built based on the IUCN Red List of Threatened Species (http://www.iucnredlist.org/multiple) and on various credible sources. GC Grigg, LA 2799 Beard, G Caughley, (1985); BG Norton, M Hutchins, EF Stevens, TL Maple, (1995); Woinarski J, Burbidge AA 2800 (2016) Phascolarctos cinereus. The IUCN Red List of Threatened Species 2016: e.T16892A21960344. Available online at, http://dx. 2801 doi.org/10.2305/IUCN.UK.2016-1. RLTS.T16892A21960344

often in terrestrial wildlife viewing in Australia, as indicated by advertising materials" (Higginbottom and Buckley 2003, p. ii). Moreover, a study carried out by Croft and Leiper (2001) reveals that "mobs of kangaroos, centre stage on a vast outback landscape, are a strong and integral attraction to Outback New South Wales" (p. iii), an opportunity for international tourism.

A couple of years later, another report also prepared by CRC's researchers team, Higginbottom et al. (2003), thoroughly evaluated the existing organised opportunities for viewing free-ranging kangaroos in Australia being concerned with description and classification of kangaroo-related tourism in the country; to describe featured aspects of this niche tourism at a business management level with regards to visitors, interpretation, kangaroo and environmental management, and to propose recommendations for best practices for future development of the sector. For their study, not only those few species correctly named as kangaroos, were considered, but also any existing species of kangaroos and wallabies (family, *Macropodidae*) and rat-kangaroos (families *Potoroidae* and *Hypsiprymnodontidae*), all referred to by biologists as *macropods* (p. 8).

Kangaroos, emus and koalas are national animals; the first two are officially on the coat of arms (Banting 2003; Minahan 2010), and koala is "an unofficial symbol" (Minahan 2010, p. 12). And, "there is a wealth of anecdotal evidence that koalas are an important aspect of a set of unique natural attractions that shape the image of Australia as a tourist destination for both domestic and overseas visitors" (Australian Koala Foundation), and it should be considered the Koalas economic contributions to tourism sector as one of the key attractions in the country (Hundloe and Hamilton 1997). Moreover, Smith et al. (2006) also discuss in their studies issues of production and consumption of wildlife icons. The name "koala" has its origin in coolah or koolah, which means "no drink" (no water), in *Dharug*, an Aboriginal language (Banting 2003, p. 26), as they do not drink much water.

In Australia, wildlife encounters are an experience that interacts with a wide range of other nature-based activities such as bush trails, bush tucker, nature contemplation, etc. Some wild animals are easy to track and observe in their habitats, however time limitations and lack of public transport in many regions may constrain the chances for opportunistic glimpses. Many visitors prefer to go to zoos, aquariums and sanctuaries for wildlife encounters, rather than go to open natural settings, e.g. a National Park. Visitors choose to go to theme parks and zoos because of the convenience of having a ready-to-use structure, multiple enjoyable recreational options, and more importantly, to be sure that they will have a collection of wild species available and on display with entertaining, informative and educational sessions and learning opportunities. It is a guaranteed fun for the whole family, as most wild animals are quite evasive and very hard to spot in the wild (Knight 2013). For example, platypuses and koalas are very elusive; on the other hand, kangaroos are easily found hopping in the outback, and for the two grey species in many coastal woodlands and forests. But, according to the World Animal Foundation alerts that not all zoos and aquariums, for example, are concerned with the needs of the animals; even though, they hold an image as education and conservation-oriented

places, most are planned and designed to serve the needs of the visitors with wild animals being captive on display and used in entertaining shows; rather than, educative ones. Many animals in zoos and aquariums reveal some abnormal behaviour as the result of being deprived of their natural habitats and social-group structures (Khan 2013). This Volume brings a valuable contribution to the literature with a chapter on captive wildlife, visitors and the human relations to nature in which Dirk Reiser (refer to Chap. 17) makes critical insights on demystifying zoos.

> Some zoos and aquariums do rescue some animals and work to save endangered species, but most animals in zoos were either captured from the wild or bred in captivity for the purpose of public display, not species protection. The vast majority of captive-bred animals will never be returned to the wild. When the facility breeds too many animals they become "surplus" and often are sold to laboratories, travelling shows, shooting ranches, or to private individuals who may be unqualified to care for them (World Animal Foundation)

Ethics on the Ark, edited by Norton et al., published in 1995, is a book that gathers various contentious viewpoints on the debate about the current situation and the future of zoos and aquariums worldwide; it has multivocal discussions on what should be the priority in these sites where wild animals are semi-captive or captive; wildlife conservation and animal rights are aspects debated by the contributors who collectively take all sides of the issues. However, it is not a mission of this chapter to make a literature review and analysis on whether Zoos and Aquarius are 'evil' or 'providential' for wild animals. The goal of the chapter is to provide a comprehensive literature review, conceptual, theoretical and practical issues vis-à-vis the wildlife resources in Australia, and the discussion on experiential learning for visitors. As part of it, the next section will outline some of the key ecological, biological, physical, behavioural aspects of three Australian species: koalas, Tasmanian devils, and kangaroos taxa. After outlining the main biofacts and information on these three marsupial species, a model of integrated interpretation and experiential learning for visitors will be produced. The main aspects and details to be outlined are: wild animal characteristics; behaviour; food, offspring; threats; and, protection/conservation. Fact sheets and biofacts of the IUCN Red List of Threatened Species of 2016, the World Animal Foundation, the Australian Koala Foundation, the National Geographic and San Diego Zoo Online Library were the main sources for information used to outline and describe the Red Kangaroo, Koala, and Tasmanian Devil. The Mammals of Australia, edited by Ronald Strahan and Steve van Dyck brings comprehensive data on these species.

8.12.1 Koala

8.12.1.1 Koalas, Not a Bear!

The koala looks like a teddy bear, but is a marsupial with a compact round body, soft woolly fur, grey above and white under parts; it has black nose, short limbs, and rounded ears, all of which add to its perceived 'cuteness'. In reason of its *Eucalyptus* leaf-based diet, the koala has very strong chewing muscles, sharp molars, and large jaws; it usually weighs between 4 and 15 kilos, on average 11 kg; its size depends on the latitude the koala lives: smaller in the north; the females are smaller than males. The fingerprints of koalas and of humans are strikingly similar (Henneberg et al. 1997); it has highly sensitive ears; its body length: 60–85 cm (Fig. 8.11).

8.12.1.2 Behaviour

Koalas are not migratory animals, and they are actually solitary except for brief interaction in breeding season and mothers with dependent young Martin and Handasyde (1999) emphasise that the koalas spend a lot of time alone and devote limited time to social interactions. Also the available literature states that the koalas are not territorial, but that there is a dominance hierarchy (Strahan and Van Dicky) and in stable breeding groups, but studies show that females are also fertilised by males that are 'just passing through'. Individual members remain in their own "home range" areas, usually a selection of eucalyptus trees. The animals are mammals with nocturnal habits, and usually they sleep up to 16 h every day. Their life is on the trees; they are arboreal, and do not live in big groups; rather, they prefer to be alone, particularly the females; they are solitary. All koalas sleep on tree fork or on a branch; they do not make nests, and use their massive claws for climbing the trees; the pace is determined by an existing threat or not, but normally they move slowly. The koala is a skilled swimmer, particularly escaping from a threat. Koalas eat eucalyptus leaves from only a few species; each animal eats an incredible amount of one kilogram of leaves per day, even storing them in their cheeks. The trees are home for koala; a place for social relations and mating, food source and shelter. They usually respect each other trees; after a Koala dies it takes up to 12 months to take ownership of it; this is a period time enough for scratches and scents of the former dweller to disappear. Koalas use varied sounds to communicate with each other; a male koala usually defends its territory (tree range) by bellowing against the intruder; this avoids physical confrontation. Males save fighting energy by bellowing their dominance. Female koalas do not bellow as much as males; they do to demonstrate aggressive and sexual behaviour.

,About this picture
Source: Wikipedia Commons
Author: Erik Veland

BABY KOALA
Image captured at
Currumbin Wildlife
Sanctuary
Gold Coast,Queensland
Australia

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Diprotodontia	Phascolarctidae

Scientific Name: Phascolarctos cinereus
Synonym: Lipurus cinereus Goldfuss, 1817

Habitat and Ecology:

The Koala is an arboreal folivorous marsupial. It occurs in forests and woodlands, typically dominated by eucalyptus species. In inland (semi-arid) portions of its range, it occurs mainly in riparian woodlands (Ellis et al. 2002, Seabrook et al. 2011). Elsewhere distribution may be associated particularly with soil fertility (and hence foliage nutrient content) (Moore and Foley 2000). The Koala has a specialist diet, mostly limited to foliage of Eucalyptus species, with occasional intake of leaves of other plant (mostly Myrtaceous) genera (Martin and Handasyde 1999; Moore and Foley 2000, 2005). At high population densities, Koalas can defoliate preferred tree species, causing tree death and subsequent Koala population crash (Menkhorst 2004, 2008). The Koala is mostly solitary, but individuals have extensive overlap in home ranges. Home range size varies substantially with forest structure and productivity, and males typically have larger home ranges than females. In a coastal forest in New South Wales, average home range size was 10 ha (for females) to 20 ha (for males) (Lassau et al. 2008); in inland Queensland home ranges were 100 ha (for females) to 135 ha (for males) (Ellis et al. 2002). Breeding is seasonal, with births (typically of single young) in October-May. Females can produce young at annual intervals, but births per adult female per year average 0.3-0.8 (McLean 2003). Sexual maturity is reached at 18 months (Jackson 2007). In the wild, longevity of 12 (for males) to 15 years (for females) has been reported (Martin and Handasyde 1999).

*** Generation length**: 6-8 years (Phillips 2000). *** Systems:** Terrestrial *** Mobility:** not migrant

Major Threats: Current threats to this species include continued habitat destruction, fragmentation, and modification (which makes them vulnerable to predation by dogs, vehicle strikes, and other factors), bushfires, and disease, as well as drought associated mortality in habitat fragments. Public concern for the species is high. There are management problems with many populations; remnant populations living at high densities in isolated patches of habitat are at greatest risk (Martin *et al.*2008). Effective management of some of the threats on the mainland could lead to excessive abundance and result in pest problems similar to those occurring on Kangaroo Island and in parts of Victoria. The overall distribution of Koalas has been reduced since European settlement.

Biodiversity Source: Woinarski, J. & Burbidge, A.A. 2016.*Phascolarctos cinereus*. The IUCN Red List of Threatened Species 2016: e.T16892A21960344. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T16892A21960344.en. Downloaded on **27 November 2016**.

Fig. 8.11 Koala biofacts

8.12.1.3 Offspring

Koalas breed just once a year, and gestation lasts 35 days; a baby koala is a hairless, blind, and earless joey. At birth, it only has the incredible size of a jelly bean and grows in the pouch on the mother's belly. The joey will stay in the company of the mother for about six months until weaning is complete or so, riding on her back, and feeding on both milk and gum leaves until weaning is complete at about 12 months of age. At the moment a koala reaches its sexual maturation, it leaves its mother's home and finds its own tree range.

8.12.1.4 Threats and Conservation

According to World Animal Foundation, Koalas once in number of millions have faced an extreme decrease of its population, particularly in the 1920s because of hunters looking for their fur; nowadays, the threats are in reason of their habitat destruction, road deaths, and dogs; these combined kill about 4000 koalas every year. Koalas demand large forest areas and corridors in search for territory and for mating. Human population boom of the coastal regions of Australia, consequently resulting in higher demands for urban area development, logging, road construction and agriculture contribute to decrease areas of bush. Also some diseases have been a cause of death in some koala colonies, particularly due to chlamydia and an outbreak of sarcoptic mange (Jackson 2003). On the other hand, overpopulation of koalas also threatens the species. On Kangaroo Island, South Australia, koalas were introduced about 90 years ago and have thrived steadily since then in the absence of predators, "the koala's main enemies are the dingo and the fox" (Hunter 1987, p. 52); this item combined with the fact that koalas are not migrant animals have made Kangaroo Island unsustainable for themselves and for other species; the super-population of koalas represents a threat to an unique ecology of the island. The most viable and likely solution may be a complex sterilisation method; a cull is improbable due to koala's popularity and the negative public opinion it can raise against the government and tourism sector. The translocation resulted in a negligible success, and a relocation to the mainland may not be also successful because there are evidences that koalas may hardly establish in the new area, and Masters et al. (2004) develop a very detailed study on the koalas on Kangaroo Island by examining it

RED KANGAROO

Australia

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Diprotodontia	Macropodidae

Scientific Name: *Macropus rufus*

Habitat and Ecology:

It is found in arid and semi arid habitats. Animals are dependant on green herbage, and populations subsequently decline during drought periods (Croft and Clancy 2008). It is capable of travelling long distances (over 200 km) in response to localized rainfall.

Population: It is an abundant species (Croft and Clancy 2008) that is subject to commercial take under nationally approved management plans. Its abundance is limited by dingo predation, hence it is generally greater in abundance south of the dog fence or within dingo controlled zones. The species has benefited from pastoral infrastructure (i.e., artificial water sources).

Major threat: There appear to be no major threats to this species. There is regulated harvesting of this species for meat and hides.

Conservation actions: This species is present in many protected areas. Harvesting of the species is regulated.

*** Systems:** Terrestrial

Biodiversity source: Ellis, M., van Weenen, J., Copley, P., Dickman, C., Mawson, P. & Woinarski, J. 2016. *Macropus rufus*. The IUCN Red List of Threatened Species 2016: e.T40567A21953534. Downloaded on **27 November 2016**

Fig. 8.12 Red Kangaroo biofacts

from the introduction to pest status in less than a century. The koala on Kangaroo Island became a 'conundrum' because its population management illustrates an example of "conflict between conservation and animal welfare" (Lindenmayer and Burgman 2005, p. 21). However, the investigation of Masters et al. (2004) can shed light on the case as they examine it from the introduction to pest status.

The koala's slow reproduction rate (one young per year) makes it especially vulnerable to population decline. Its specialised diet makes it vulnerable to habitat destruction, and its sense of home range and favourite trees makes it vulnerable to roadkill and dog attack when human residential and road development occurs in its district, as it still tries to visit the areas it used to know (as explained by Ronda Green, this chapter: IUCN Red List data) (Fig. 8.12).

8.12.2 Red Kangaroo

8.12.2.1 Kangaroo Fact Sheet and History

Marsupials probably arrived in Australia between 71.2 and 65.2 million years ago late in the Cretaceous age (Beck 2008). The possum-like marsupial mammals are regarded as the ancestors of the kangaroos (Prideaux and Warburton 2010), and between 50 and 34 million years ago, during the Eocene age, it is believed that their ancestors lived in trees in forests. The fossils of macropod family, kangaroos are dated to about 23 million years ago during early Miocene (Archer and Bartholomai 1978). Some studies have suggested that the hopping has evolved as early as 30 million years ago in forested ecoregions (Dawson and Webster 2010). During the late Pleistocene age, there were two giant kangaroos (Dawson 1995): *Macropus titan* (Marshall and Corruccini 1978) and a large grey kangaroo. "The largest (*Procoptodon goliah*) had an estimated body mass of 240 kg, almost three times the size of the largest living kangaroos, and there is speculation whether a kangaroo of this size would be biomechanically capable of hopping locomotion" (Janis et al. 2014). The Department of the Energy and Environment, Australian Government, released some figures in 2011 with estimated number of kangaroos in four regions of the country and includes four existing species: Red (*Macropus rufus*); Western Grey (*Macropus fuliginosus*); Eastern Grey (*Macropus giganteus*); and Wallaroo/Euro (*Macropus robustus*). Total estimated number of kangaroos for that year was 34,303,677 animals (see Table 8.6). The estimation was done by aerial and ground surveys in areas where commercial harvesting takes place, but the actual national

Table 8.6 Kangaroo population in four Australian regions as estimated in 2011

2011 population estimates for kangaroos within the commercial harvest areas					
State	Red (*Macropus rufus*)	Western grey (*Macropus fuliginosus*)	Eastern grey (*Macropus giganteus*)	Wallaroo/Euro (*Macropus robustus*)	Total
South Australia	1,158,000	674,800	–	494,800	2,327,600
Western Australia	638,185	1,177,534	–	–	1,815,719
New South Wales	3,972,522	496,059	5,258,104	88,430	9,815,115
Queensland	5,745,591	–	10,799,679	3,799,973	20,345,243
Total	11,514,298	2,348,393	16,057,783	4,383,203	34,303,677

Source Department of the Energy and Environment, Australian Government, 2011, online

populations of this species of *macropods* can be significantly higher nationwide. In 1984, a survey carried out a team of researchers (Grigg et al. 1985), published by *Search*, estimated a total of kangaroos' population (not including the wallaroos): 13,283,000 animals. It is believed that there are nearly three times more kangaroos in Australia than cows (Australianwildlife.net).

Currently, it is estimated a total population of up to 60 million Kangaroos living in the country for all 48 kangaroo species (Reference.com). In the *Blogs.Reuters.com*, a short essay entitled 'A necessary evil: the cull of kangaroos', advocates favourably for it by sustaining that "mobs of kangaroos can quickly damage the environment and compete with livestock for scarce food, impacting the livelihood of farmers" (Gray 2013, online). Also as a form of kangaroos' population control with economic and market ends, Spiegel and Wynn (2014) presented a research on the possibilities and implications for promoting kangaroos as a sustainable option for meat production on the rangelands of Australia; the main domestic market problem is that "the consumption of kangaroo […] by the general population [in Australia] is still uncommon, even though the animal has long been utilised as a bush food by the Aboriginal people" (p. 38), and for a real market and demands this is an issue to be considered.

8.12.2.2 Kangaroo Physical Characteristics

The red kangaroo is the largest marsupial and the largest of its family. It has small head, big ears and dark eyes, and a very long and thick tail used for balance while it hopes (Nowak 1999). The red kangaroo can move its ears through 180° independent of each other (Tyndale-Biscoe 2005). It can be differentiate from other kangaroos by a white underbelly and white patch that extends from its mouth to its ears (Newsome 1995). A male red kangaroo usually weighs between 25 and 85 kg (48–187 lb), and a female, 17–35 kg (37–77 lb). Male kangaroos are generally taller than females of the same species. For males, a body length is 93.5–140 cm (3.1–4.6 ft), and for females: 74.5–110 cm (2.5–3.6 ft). A standing height, it is usually 1.5–2.0 m (4.9–6.6 ft) for males; a male red kangaroo can reach up to 2 m standing higher on its toes when getting aggressive. A male tail can be as long as 1 m (3.3 ft). All *macropods* share the same following characteristics: pouch opens forward and it has four teats; forelimbs are shorter and weaker than hind limbs; long narrow feet; and, it has five digits in its forelimbs. The kangaroo family (macropodidae; macropodids) has "large arytenoid cartilages and very-small vocal or non-existent vocal cords" (Symington 1898, cited in the Australian Journal of Zoology 41, 1993, p. 258).

8.12.2.3 Behaviour and Offspring

Kangaroos can bound at speeds up to 30 miles per hour and can leap some 30 ft. Kangaroos use their long tails for balancing. They can tolerate high temperatures being adapted to dry, infertile areas and to a highly variable climate. On average, kangaroos live in the wild for six to eight years. Kangaroos are grazing herbivores, which means their diet consists mainly of grasses, "just like cattle and sheep, so the grassland consumption of kangaroo populations has been monitored closely" (Reference.com), and can survive long periods without drinking water. Female kangaroos carry newborns, called "joeys" in a pouch on the front of their bellies. As with all marsupials, the joeys are born at a very early stage of development after a gestation that lasts between 31 and 36 days. Newborn joeys have only the forelimbs and the mouth fully developed to allow them to climb to the mother's pouch and to attach to one of her teats, which then swells inside the mouth to keep the joey firmly in place in its early weeks. As for comparison, a human embryo at a similar stage of development would be about 7 weeks old, not mature enough to survive. Kangaroos live and travel in organised groups or "mobs" of ten or more animals, and the mob is dominated by the largest male, called a boomer or buck, it has a certain exclusivity to females for mating; and courtship behaviour in a mob includes the male "checking" the female's cloaca; a female after being checked, it usually urinates, and the boomer then sniffs the urine several times —if he is satisfied and the female shows she is receptive by raising her tail—the male kangaroo starts the mating act.

The arched tail is also an evidence that kangaroos are ready to mate. In reason of their larger size, female kangaroos often reject males by simply moving away from them. Usually, female kangaroos give birth to one joey at a time. A red kangaroo joey does not leave the pouch until it is about eight months old. Amazingly, a female kangaroo can freeze the development of an embryo until the previous joey is big and strong enough to leave the pouch. There are usually three stages at once: a large joey that can come on and off the teat and in and out of the pouch, a younger one that is attached to the teat and receiving a more nutrient-rich milk, and the embryo which is dormant until the younger one detaches from the teat (as explained by Ronda Green, by reviewing this Chapter). The mother's milk varies in its composition according to the needs of the joey; "she is also able to simultaneously produce two different kinds of milk for the newborn and the older joey who still lives in the pouch" (World Animal Foundation 2016, online). According to World Animal Foundation, kangaroos are shy and retiring by nature, and in normal circumstances present no threat to humans. Male kangaroos often "box" amongst each other, playfully, for dominance, or in competition for mates. But, Ronda Green explains, in her review for this chapter that, "they actually don't box; they use their arms to hold the opponent, either in play or a real fight, and kick with their hind legs, using their tails for balance—I've often witnessed it and raised young male kangaroos that tried to play with me in this way when adolescent". Their sharp toenails and long, powerful feet can disembowel an adversary: it has happened to dogs that dare to attack them.

8.12.2.4 Threats

Humans hunt kangaroos for their meat and hides, but this is highly regulated. Also, the presence of domestic herbivores, such as rabbits, cattle, and sheeps can increase disputes for plants and this population of domestic animals can lead to food shortages particularly in times of drought. Many are hit by cars.

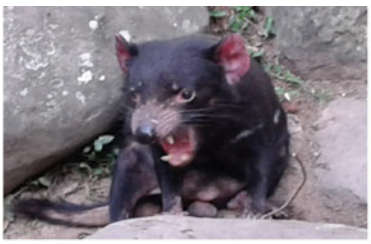
8.12.3 Tasmanian Devil

8.12.3.1 Tasmanian Devil Biofacts

See Fig. 8.13.

8.12.3.2 Physical Characteristics, Habits, Feeding and Behaviour

The Tasmanian devil is the largest carnivorous marsupial in the world (National Geographic online) after the extinction of the thylacine reportedly in 1936 and its dietary source is insects, snakes, birds, fish, and other small animals, or carrion of any size. It is notoriously known as a voracious



TASMANIAN DEVIL

Image captured at Currumbin Wildlife Sanctuary in 2015 by **Ismar Lima**

Gold Coast, Queensland Australia

Taxonomy

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Dasyuromorphia	Dasyuridae

Scientific Name: *Sarcophilus harrisii*

Habitat and Ecology:
Tasmanian Devils are found throughout Tasmania, in all native terrestrial habitats, as well as in forestry plantations and pasture, from sea level to all but the highest peaks of Tasmania (Jones and Rose 1996, Jones and Barmuta 2000). Densities are lowest in the buttongrass plains of the south-west and, prior to Devil Facial Tumour Disease (DFTD) emergence, highest in the dry and mixed sclerophyll forests and coastal heath of Tasmania's eastern half and north-west coast (Jones and Rose 1996). Open forests and woodlands are preferred, while tall or dense wet forests are avoided (Jones and Rose 1996; Jones and Barmuta 2000).Tasmanian Devils are able to reach very high densities, even in suboptimal habitat, if sufficient food and den sites are available. The 14 km² Badger Island at one time supported 120 Tasmanian Devils. Seabird colonies, such as Short-tailed Shearwaters (or muttonbirds, *Puffinus tenuirostris*), are thought to have traditionally been a preferred habitat for Tasmanian Devils, providing an important food source. These are now much reduced along the east coast, but some sites remain along the west coast (D. Pemberton pers. Comm.). Devils are usullay of nocturnal habits.

Major threat: The major threat to this species at present is Devil Facial Tumour Disease (DFTD), compounded by roadkills, dog kills and persecution.

Conservation actions: As of May 2008, the Tasmanian Devil is listed as Endangered under the Tasmanian Government's *Threatened Species Protection Act 1995*. It is also listed as Vulnerable under the Australian Government *Environment Protection and Biodiversity Conservation Act 1999*. *Insurance strategy:* The highest priority is to establish insurance populations of healthy devils in places isolated from the disease, firstly to avoid total extinction and, secondly, as a source for reintroduction to the wild if devils, and therefore also the disease, become extinct.

*** Systems:** Terrestrial.

Biodiversity source: Hawkins, C.E., McCallum, H., Mooney, N., Jones, M. & Holdsworth, M. 2008. *Sarcophilus harrisii*. The IUCN Red List of Threatened Species 2008: e.T40540A10331066. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T40540A10331066.en. Downloaded on **27 November 2016**.

Fig. 8.13 Tasmanian devil biofacts

animal that consumes nearly everything of a prey, which includes bones, organs, and even hair; it is an eating machine that crushes all for feeding itself! "Feeding devils exhibit twenty known physical postures, including their characteristic vicious yawn, and eleven different vocal sounds. They usually establish dominance by sound and physical posturing" (World Animal Foundation). On average, this marsupial eats roughly 15% of its body weight every day, and amazingly it can devour up to 40% of its body weight in just 30 min if it has enough food for it. In fact, eating is a social event for them. The animal has a threatening appearance particularly as a fighting style; thus, "diminutive as it may be, don't be fooled".

Tasmanian devils have "a notoriously cantankerous disposition and will fly into a maniacal rage when threatened by a predator, fighting for a mate, or defending a meal" (National Geographic, online). Early Europeans during colonial period have named it 'devil' due to its scary displays, "teeth-baring, lunging, and an array of spine-chilling guttural growls" (Livescience online). Tasmanian devil has a muscular body shape, usually of dark colour, with black fur, and it has a sharply strong odour. It is usually quite noisy, blaring, and roaring, particularly when feeding; and it has the strongest bite compared to any other marsupial, and "it hunts prey and scavenges carrion as well as eating household products if humans are living nearby, and unlike most other dasyurids, the devil thermoregulates effectively and its active during the middle of the day without overheating," and is surprisingly able to speed and endure, climbing trees and is very good swimmer in the rivers (World Animal Foundation). Tasmanian devil prefers open forest to tall forest, and dry rather than wet forests. Areas near creeks and thick grass tussocks are chosen as dens, and they use the same dens the whole life. It has nocturnal habits leaving its shelter for hunting, feeding and mating; during the day he solitarily spends the time in burrows, caves and hollow logs. Due to its night-vision capability, the devil's white patches can be easily noticed by its "mates". The "Devils" use "their long whiskers and excellent sense of smell and sight to avoid predators and locate prey and carrion" (National Geographic online). It is worth knowing that the Devil's tail is "important to its physiology, social behavior and locomotion. It acts as a counterbalance to aid stability when the devil is moving quickly. A scent gland at the base of its tail is used to mark the ground behind the animal with its strong, pungent scent" (World Animal Foundation).

8.12.3.3 Offspring and Threat

According to fact sheets of the World Animal Foundation, the Tasmanian devils are not monogamous, and their offspring are usually very competitive with males fighting one another for mating. "Females can ovulate three times in as many weeks during the mating season, and 80% of two-year-old females are seen to be pregnant during the annual mating season. A female devil has on average four breeding seasons per year, and gives birth to 20–30 babies after a Females average four breeding seasons in their life and give birth to 20–30 live young after a gestation of three weeks. "The newborn are pink, lack fur, have indistinct facial features and weigh around 0.0071 oz at birth. As there are only four nipples in the pouch, competition is fierce and few newborns survive. The young grow rapidly and are ejected from the pouch after around 100 days" (World Animal Foundation). Tasmanian devils are regarded as adult at two years of age, and they usually live more than five years in the wild. The main threats currently affecting the animal have been the Devil Facial Tumour Disease (DFTD) (Breed et al. 2009) and on Gold Coast, Australia, Currumbin Wildlife Sanctuary's Insurance Population Program has tried to keep healthy animals on the mainland away from sick ones to prevent the spread infection for the survival of the species (see Fig. 8.14). For a comprehensive inventory on Tasmanian wildlife tourism, refer to the CRC Report prepared by Kriwoken et al. (2002).

8.13 Final Considerations: Interpretation and Education on Wildlife for Visitors Experiential Learning

The issues approached and discussed in this chapter reinstate and corroborate many of the well-known facts about the wildlife and tourism such as the human-caused disturbances and impacts, and the importance of rangers and guides for enriching one's visit in the wild, zoos, and parks. It is noted that more pro-active wildlife tourism with interactive and educational experiences should be part of tourism attractions, sites and destinations as a way of allowing human-nature reconnection. These encounters should occur in a way that could increase visitors' learning, feelings and awareness towards wildlife and the biodiversity. As presented in the former sections through biofacts, behaviour and characteristics, most Australian wild animals are fascinating, intriguing, endemic, and unique in many senses with a great tourism appeal. In Australia, it can be observed some initiatives by government and its bodies, organisations and private sector that have tried to make visitors' experiences more meaningful while protecting the species and their habitats; attractions have underpinned 'environmental learning', 'recreation', and 'conservation' into the same basket, even some commercially-oriented places and tours have tried to balance wildlife displays and shows with significant actions and projects in benefit of the wild animals.

The challenge has been to congregate all information and facts on wildlife and to address them to heterogeneous

Fig. 8.14 Currumbin Wildlife Sanctuary's Program for controlling the spread of 'Facial Tumour Disease' (DFTD) on Tasmanian devils on the mainlands. *Source* Author own work, 2015

groups of visitors. For achieving it, techniques, strategies and interactive activities should be part of a well-elaborated interpretative planning. Aspects such as taxonomy, species distribution, habitats, physical characteristics, population, lifespan, behaviour, diet and feeding, offspring and reproduction, ecology and wildlife web of relations, managed care, threats, and conservation are interrelated ecological, biological and ecosystemic facts and data that can be object of a content to be delivered to visitors according to their age range and visit goals. The challenge is exactly to deliver this type of content in a way that is interesting, entertaining and meaningfully mediated to touch the visitors' sensibility towards nature, without making a visit a dry, exhaustive or boring seminar. More in-depth content can be delivered to curriculum-based visitors and to segmented groups with specific knowledge demands for wildlife and ecosystem. Independently from the type of audience, there are six basic rules of interpretation that must be taken into account by interpreters (guides, rangers, instructors, teachers, etc.): (1) people learn better when they are actively involved; (2) people learn better when they are using as many senses as appropriate; (3) new learning is built on a foundation of knowledge; (4) people prefer to learn that which is of most value to them at the present moment and knowing the usefulness of the knowledge being acquired makes learning more effective; (5) that which people discover for themselves generates a special and vital excitement and satisfaction; (6) learning requires activity on the part of the learner (Fa et al. 2011, p. 227). For the last one, interpreters need to find ways of getting attention and of engaging them in activities that are conducive to learning. The question of motivation in outdoor activities for experiential learning can be also approached through the use of the phenomenology; a philosophical discipline that studies the structures of experience and it draws attention to the ways in which an individual creates a meaningful world (Brown 2003).

As underlined by Green (2014), if tourists are introduced to the beauty, fascination, quirky behaviours and ecological roles (e.g. seed dispersal by cassowaries and flying foxes) of wildlife and then some of the conservation problems are explained to them in a way they understand and relate to, they may be more likely to minimise their own impacts when wildlife-viewing, support conservation initiatives and even become ambassadors for wildlife conservation generally.

Environmental interpretation and education is a tool that rangers, guides, instructors, teachers, etc. should wisely use to deliver biological and ecological content to visitors by serving as mediators—knowledge building bridges—between visitors and the wonders of nature while caring for nature and promoting conservationist messages. Experiential learning theory of Kolb can be adapted to the context of nature-based tourism and guiding, and it is observed that there is a paucity of research in this field. As for the question, what is necessary for a meaningful educative wildlife tourism through experiential learning? A deterministic answer lies in the ultimate fact that the wildlife and ecosystems need conservation and protection for ensuring wildlife resources.

Educative tourism needs to be developed based on visitors' needs, interest, motivation and engagement through meaningful strategies; creative and innovative ways are mandatory to present the natural world to reconnect humans to nature and make them more sensitive to current environmental challenges towards a better world to all living beings, and this understanding has been shared by Green et al. (2001), Green and Higginbottom (2001), Weiler and Black (2015), and by many organisations such as Wildlife Tourism Australia and Interpretation Australia. The Sustainable Tourism CRC Reports gather an outstanding collection of research and studies that were developed for many years and thoroughly assessed the wildlife tourism in Australia since 2001 (Higginbottom et al. Part I & 2, 2001a, b; Davis et al. 2001).

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